

# PEFO Cycle 6

## Final Report

### Road Inventory and Condition Assessment of Paved Routes Petrified Forest National Park



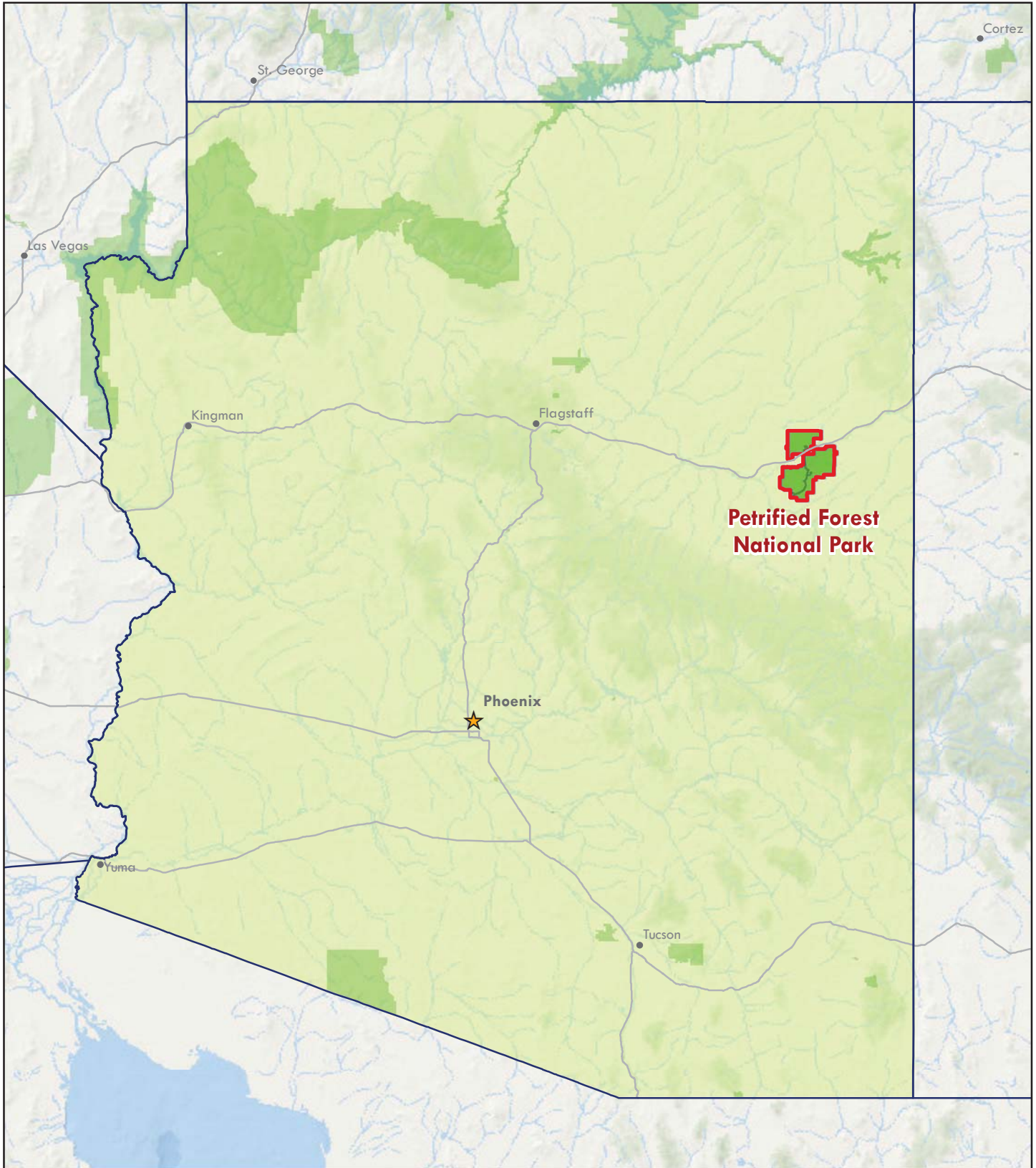
**Federal Lands Highway  
Road Inventory Program**

#### Prepared By:

Federal Highway Administration  
Eastern Federal Lands Highway Division  
Road Inventory Program (RIP)

Report Date: June 2017

# Petrified Forest National Park in Arizona



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# Section 1 Introduction



**Petrified Forest National Park**



**Federal Lands Highway  
Road Inventory Program**

# Introduction

The Federal Highway Administration’s (FHWA), Road Inventory Program (RIP) inventories all roads and parking areas in the National Park System, and performs condition inspections on all paved roads and parking areas for the National Park Service (NPS). This report contains the results of the Cycle 6 condition assessment of paved roads and parking lots for this park unit. This assessment was done using an automated, state-of-the-art pavement inspection vehicle as well as manual ratings. This information represents the condition of the paved assets at the time of the inspection. The pavement management system utilized by FHWA and the NPS uses these assessments to estimate future conditions and help prioritize pavement maintenance and rehabilitation projects. Further information about RIP data and its role in managing paved roads and bridges can be obtained by contacting the NPS Regional Transportation Program Manager.

### *A History of the Road Inventory Program:*

The FHWA, in the mid-1970s, was charged with the task of identifying surface condition deficiencies and corrective priorities on NPS roads and parkways. Additionally, FHWA was tasked with establishing an integrated maintenance features inventory, locating features such as culverts, guardrails, and signs, among others, along NPS roads and parkways. As a result, in 1976 the NPS and FHWA entered into a Memorandum of Agreement (MOA) which established the RIP. This MOA was revised in 1980 to update RIP data collection standards and develop a long-range program to improve and maintain NPS roads to designated condition standards and establish a pavement management program.

The FHWA completed the initial phase of inventory in the early 1980s. As a result of this effort, each NPS unit included in the collection received a RIP Report known as the “Brown Book” which contained information that was inventoried during this first RIP phase. In the 1990s, a cyclical program was developed, and since then five cycles of collection have been completed. Cycle 6 is currently in progress. A summary of the RIP collection cycles is shown in the table below.

<b>Cycle</b>	<b>Years</b>	<b>Parks Collected</b>
Cycle 1	1994 - 1997	◦ 44 Large Parks
Cycle 2	1997 - 2001	◦ 79 Large Parks ◦ 5 Small Parks
Cycle 3	2001 - 2004	◦ All Large Parks ◦ All Small Parks
Cycle 4	2006 - 2010	◦ 86 Large Parks ◦ Several Small Parks
Cycle 5	2010 - 2014	◦ All Large Parks (Only functional class 1, 2, 7, and new/modified routes collected) ◦ All Small Parks (all roads and parking areas collected)
Cycle 6	2014 – 2020 (±)	◦ All roads and parking areas collected at all Parks ◦ Additional partial collections of functional class 1, 2, and 7 roads at Large Parks ◦ Cycle 6 is expected to last 6 years

Note: Large Parks have ≥ 10 Paved Miles; Small Parks have < 10 Paved Miles

Since 1984, the Road Inventory Program has been funded through the Federal Lands Highway Park Roads and Parkways (PRP) Program. Currently, coordination of the RIP with Federal Lands Highway (FLH) is under the NPS Washington Headquarters Park Facility Management Division. The FLH Washington office coordinates policy and prepares national reports and needs assessment studies for Congress.

In 1998, the Transportation Equity Act for the 21st Century (TEA-21) amended Title 23 U.S.C., and inserted Section 204(a)(6) requiring the FHWA and NPS, to develop by rule, a Pavement Management System (PMS) applied to park roads and parkways serving the National Park System.

In 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) amended Title 23 U.S.C., and under Section 203(c)(1-2) stated that the National Park Service in cooperation with the DOT/FHWA, shall maintain a comprehensive national inventory of their transportation facilities, with the goal of quantifying transportation infrastructure needs within the National Park System.

***A History of the Pavement Management System:***

In 2005, the FHWA began implementing the use of a pavement management system to assist the NPS in prioritizing Pavement Maintenance and Rehabilitation activities. The system used by FHWA is the Highway Pavement Management Application (HPMA), which has the ability to store inventory and condition data from RIP and forecast future performance using prediction models. Outputs include performance and condition reports at the National, Regional, Park, or Route level. Regional prioritized lists and optimizations have been produced for most regions, and the Service's overall roadway Deferred Maintenance is calculated via the HPMA.

***Overview of Cycle 6:***

Cycle 6 launched in the spring of 2014 and will again comprise all NPS park units that are served by paved roads and/or parking areas. For Cycle 6, all paved roads (approximately 5,700 miles) and parking areas will be collected in all parks at least once, while the primary routes (functional class 1, 2, and 7 roads) at Large Parks will have additional collections. These multiple collections will provide updated condition data on a majority of the NPS's primary road network and help build a better pavement management system, allowing for more accurate pavement performance prediction models.

FLH is responsible for the accuracy of all data presented in this report. Any questions or comments concerning the contents of this report should be directed to the national RIP Coordinator located in Sterling, Virginia.

Respectfully,

FHWA RIP Team

FHWA/Eastern Federal Lands  
21400 Ridgetop Circle  
Sterling, VA 20166  
(571) 434-1574

FHWA/Central Federal Lands  
12300 West Dakota Ave  
Lakewood, CO 80228  
(720) 963-3556

## Section 2 Park Route Inventory



Petrified Forest National Park



Federal Lands Highway  
Road Inventory Program

# Cycle 6 NPS / RIP Route ID Report

(Numerical By Summary Route and Subcomponent #)



Shading Color Key

White = Paved Routes, DCV Driven

Grey = Paved Routes, DCV not Driven

Black = Non-NPS Routes

■ = Concession Route

Yellow = Unpaved Routes, DCV not Driven

Blue = Paved Parking Areas

Green = Unpaved Parking Areas

Red text denotes:

\*Unpaved route data was obtained from the NPS and was not collected by the Road Inventory Program (RIP).

DCV = Data Collection Vehicle  
 MRL = Manually Rated Line  
 MRP = Manually Rated Polygon  
 PKG = Parking Areas  
 NC = Not Collected

## PEFO Petrified Forest National Park

### ROAD INVENTORY (1100 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description		Maintenance District	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
						From	To									
0010	6	1	74016		NORTH-SOUTH HIGHWAY	FROM ROUTE 0913 (NORTH ENTRANCE PARKING)	TO SOUTH PARK BOUNDARY		YES	28.48	0.00	28.48	1		AS	1,2
0011	6	1	74031		BLUE MESA ROAD	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 15.81 ON LEFT	TO END OF LOOP		YES	3.45	0.00	3.45	2		AS	2
0012	6	1	74032		NEWSPAPER ROCK ROAD	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 12.05 ON RIGHT	TO ROUTE 0916 (NEWSPAPER ROCK PARKING)		YES	0.25	0.00	0.25	2		AS	1
0014	6	1	74034		JASPER FOREST ROAD	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 18.67 ON RIGHT	TO END OF LOOP		YES	0.51	0.00	0.51	2		AS	2
0200	6	1	74036		CHINDE POINT ACCESS ROAD	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 2.46 ON RIGHT	TO END OF PAVEMENT AND ROUTE 0903 (CHINDE POINT PARKING)		YES	0.34	0.00	0.34	2		AS	1
0400	NC		74037		OLD ROUTE 66	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.89 ON RIGHT	TO EAST PARK BOUNDARY		NO	0.00	2.80	2.80	6		GR	
0401	NC		74038		GRAVEL PIT ROAD	FROM ROUTE 0400 (OLD ROUTE 66)	TO GRAVEL PIT		NO	0.00	0.50	0.50	6		NV	
0403	NC		74040		PAINTED DESERT SPUR ROAD #2	FROM ROUTE 0400 (OLD ROUTE 66)	TO END		NO	0.00	0.36	0.36	6		NV	
0404	NC		74041		NORTHEAST FENCE LINE ROAD	FROM ROUTE 0400 (OLD ROUTE 66)	TO END		NO	0.00	8.52	8.52	6		NV	
0406	NC		74044		SOUTH PIPELINE ROAD	FROM ROUTE 0409 (OLD ROUTE 180 NORTH) AT MP 1.31 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 19.17 ON RIGHT		NO	0.00	15.01	15.01	6		NV	
0407	NC		74045		NORTH PIPELINE ROAD #1	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY)	TO INTERSTATE 40		NO	0.00	1.23	1.23	6		NV	
0408	NC		74046		NORTH PIPELINE ROAD #2	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY)	TO INTERSTATE 40		NO	0.00	1.75	1.75	6		NV	



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Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description		Maintenance District	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
						From	To									
0409	6	1	74042		OLD ROUTE 180 NORTH	FROM INTERSECTION OF ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 26.70 ON RIGHT AND ROUTE 0419 (OLD ROUTE 180 EAST)	TO END OF PAVEMENT		NO	1.90	0.00	1.90	6		AS	2
0410	NC		74049		LITHODENDRON WASH ROAD	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY)	TO LITHODENDRON WASH		NO	0.00	4.75	4.75	6		NV	
0411	NC		74058		LITHODENDRON WASH ROAD NORTH	FROM ROUTE 0410 (LITHODENDRON WASH ROAD)	TO THE SECOND SPUR OUT TO THE FENCE LINE		NO	0.00	1.60	1.60	6		NV	
0412	NC		74050		LITHODENDRON WASH SPUR	FROM ROUTE 0410 (LITHODENDRON WASH ROAD)	TO THE FIRST SPUR OUT TO THE SHOOTING RANGE		NO	0.00	0.60	0.60	6		NV	
0413	NC		74066		HORSE CORRAL ROAD	FROM ROUTE 0415 (PD RESIDENCE AREA)	TO THE LAGOONS		NO	0.00	0.70	0.70	6		NV	
0414	NC		74068		HORSE CORRAL SPUR	FROM ROUTE 0413 (HORSE CORRAL ROAD)	TO END		NO	0.00	0.40	0.40	6		GR	
0415	6	1	74063		PD RESIDENCE AREA	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.64 ON RIGHT	THROUGH RESIDENCE AREA		NO	0.00	0.00	0.00	6	81,730	AS	1
0416	6	1	74070		RF SOUTH RESIDENCE AREA	FROM ROUTE 0901 (RF MUSEUM AND PICNIC PARKING)	TO END		NO	0.00	0.00	0.00	6	19,650	AS	2
0417	NC		237641		RF LAGOON ROAD	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY)	TO LAGOON		NO	0.00	0.25	0.25	6		NV	
0418	NC		237642		RF LAGOON SERVICE ROAD	FROM ROUTE 0922 (RFC GIFT SHOP/MANAGERS RESIDENCE GRAVEL DRIVE AND PARKING)	TO LAGOON		NO	0.00	0.26	0.26	6		NV	
0419	6	1	237643		OLD ROUTE 180 EAST	FROM INTERSECTION OF ROUTE 0010 (NORTH-SOUTH HIGHWAY) AND ROUTE 0409 (OLD ROUTE 180 NORTH)	TO EAST PARK BOUNDARY		NO	1.92	0.06	1.98	6		AS	2

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### ROAD INVENTORY (1100 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Name	Route Description		Maintenance District	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map
						From	To									
0420	NC		237644		PD WATER TANK ROAD	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY)	TO WATER TANK		NO	0.00	0.14	0.14	6		NV	
0421	NC		242641		BLACK KNOLL ROAD (PAULSELL EXP LANDS)	FROM EAST PARK BOUNDRY	TO ROUTE 0423 (BILLINGS GAP ROAD (PAULSELL EXP LANDS))		NO	0.00	1.40	1.40	6		NV	
0422	NC		242642		CEDAR TANK ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0421 (BLACK KNOLL ROAD (PAULSELL EXP LANDS))	TO ROUTE 0424 (BLUE TANK CUTOFF ROAD (PAULSELL EXP LANDS))		NO	0.00	3.90	3.90	6		NV	
0423	NC		242643		BILLINGS GAP ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0421 (BLACK KNOLL ROAD (PAULSELL EXP LANDS))	TO ROUTE 0431 (SOUTH NINE MILE ROAD (PAULSELL EXP LANDS))		NO	0.00	3.00	3.00	6		NV	
0424	NC		242644		BLUE TANK CUTOFF ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0423 (BILLINGS GAP ROAD (PAULSELL EXP LANDS))	TO ROUTE 0429 (BLUE TANK TO PUERCO ROAD (PAULSELL EXP LANDS))		NO	0.00	2.10	2.10	6		NV	
0425	NC		242645		DOUBTFUL TANK CUTOFF ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0423 (BILLINGS GAP ROAD (PAULSELL EXP LANDS))	TO ROUTE 0422 (CEDAR TANK ROAD (PAULSELL EXP LANDS))		NO	0.00	2.00	2.00	6		NV	
0426	NC		242646		DOUBTFUL TANK ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0422 (CEDAR TANK ROAD (PAULSELL EXP LANDS))	TO EAST PARK BOUNDRY		NO	0.00	6.90	6.90	6		NV	
0427	NC		242647		SADDLE HORSE TANK ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0432 (PUERCO RIVER ROAD (PAULSELL EXP LANDS))	TO ROUTE 0428 (BLUE TANK ROAD (PAULSELL EXP LANDS))		NO	0.00	5.60	5.60	6		NV	
0428	NC		242648		BLUE TANK ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0422 (CEDAR TANK ROAD (PAULSELL EXP LANDS))	TO ROUTE 0427 (SADDLE HORSE TANK ROAD (PAULSELL EXP LANDS))		NO	0.00	5.90	5.90	6		NV	
0429	NC		242649		BLUE TANK TO PUERCO ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0422 (CEDAR TANK ROAD (PAULSELL EXP LANDS))	TO ROUTE 0432 (PUERCO RIVER ROAD (PAULSELL EXP LANDS))		NO	0.00	3.30	3.30	6		NV	
0430	NC		242650		ROCK TANK ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0432 (PUERCO RIVER ROAD (PAULSELL EXP LANDS))	TO EAST PARK BOUNDARY		NO	0.00	5.80	5.80	6		NV	

# Cycle 6 NPS / RIP Route ID Report

(Numerical By Summary Route and Subcomponent #)



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White = Paved Routes, DCV Driven

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Black = Non-NPS Routes

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Green = Unpaved Parking Areas

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## PEFO Petrified Forest National Park

### ROAD INVENTORY (1100 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Description		Maintenance District	FLTP	Paved Miles	Unpaved Miles	Total Mileage	Functional Class	Area (SQ FT)	Surf. Type	Area Map	
					From	To										
0431	NC		242651		SOUTH NINE MILE ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0423 (BILLINGS GAP ROAD (PAULSELL EXP LANDS))	TO END		NO	0.00	1.90	1.90	6		NV	
0432	NC		242652		PUERCO RIVER ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0431 (SOUTH NINE MILE ROAD (PAULSELL EXP LANDS))	TO ROUTE 0430 (ROCK TANK ROAD (PAULSELL EXP LANDS))		NO	0.00	7.70	7.70	6		NV	
0433	NC		242653		EAST TANK ROAD (PAULSELL EXP LANDS)	FROM 0434 (PINTA ROAD (PAULSELL EXP LANDS))	TO END		NO	0.00	2.00	2.00	6		NV	
0434	NC		242654		PINTA ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0432 (PUERCO RIVER ROAD (PAULSELL EXP LANDS))	TO ROUTE 0436 (SWEETWATER ROAD (PAULSELL EXP LANDS))		NO	0.00	3.70	3.70	6		NV	
0435	NC		242655		PAULSELL ENTRANCE ROAD (PAULSELL EXP LANDS)	FROM EAST PARK BOUNDRY	TO END		NO	0.00	3.50	3.50	6		NV	
0436	NC		242656		SWEETWATER ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0434 (PINTA ROAD (PAULSELL EXP LANDS))	TO DEAD WASH SOUTH		NO	0.00	9.40	9.40	6		NV	
0437	NC		242657		WEST PAULSELL ROAD (PAULSELL EXP LANDS)	FROM ROUTE 0406 (SOUTH PIPELINE ROAD)	TO ROUTE 0406 (SOUTH PIPELINE ROAD)		NO	0.00	4.80	4.80	6		NV	

### PARKING AREA INVENTORY (1300 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Description		Maintenance District	FLTP	Access Level	Area (SQ FT)	Surf. Type	Area Map	
					From	To							
0900	6	1	74073		PD VISITOR CENTER PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.28 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.44 ON RIGHT		YES	PUBLIC	90,188	AS	1
0901	6	1	74076		RF MUSEUM AND PICNIC PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 26.17 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 26.27 ON RIGHT		YES	PUBLIC	73,641	AS	2
0902	6	1	74080		CRYSTAL FOREST PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 20.41 ON LEFT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 20.47 ON LEFT		YES	PUBLIC	22,519	AS	2

# Cycle 6 NPS / RIP Route ID Report

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 MRL = Manually Rated Line  
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## PEFO Petrified Forest National Park

### PARKING AREA INVENTORY (1300 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Description		Maintenance District	FLTP	Access Level	Area (SQ FT)	Surf. Type	Area Map	
					From	To							
0903	NC		74081		CHINDE POINT PARKING	FROM END OF ROUTE 0200 (CHINDE POINT ACCESS ROAD)	TO PARKING		NO	PUBLIC	65,340	GR	
0904	6	1	74086		AGATE BRIDGE PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 17.97 ON LEFT	TO PARKING		YES	PUBLIC	23,965	AS	2
0905	6	1	74088		TIPONI POINT PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.98 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 1.10 ON RIGHT		YES	PUBLIC	39,281	AS	1
0906	6	1	74092		TAWA POINT PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 1.86 ON RIGHT	TO PARKING		YES	PUBLIC	30,360	AS	1
0907	6	1	74095		KACHINA POINT PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 2.20 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 2.32 ON RIGHT		YES	PUBLIC	43,553	AS	1
0908	6	1	74101		PINTADO POINT PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 3.06 ON RIGHT	TO PARKING		YES	PUBLIC	17,188	AS	1
0909	6	1	74103		NIZHONI POINT PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.22 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.30 ON RIGHT		YES	PUBLIC	22,823	AS	1
0910	6	1	74105		WHIPPLE POINT PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.43 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.52 ON RIGHT		YES	PUBLIC	21,571	AS	1
0911	6	1	74107		LACEY POINT PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.84 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.91 ON RIGHT		YES	PUBLIC	14,583	AS	1
0912	6	1	74110		PUERCO PUEBLO PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 11.07 ON LEFT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 11.14 ON LEFT		YES	PUBLIC	38,018	AS	1
0913	6	1	74113		NORTH ENTRANCE PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.04 ON RIGHT	TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.06 ON RIGHT		YES	PUBLIC	25,330	AS	1
0914	6	1	74120		BLUE MESA LOOP TRAIL PARKING	ADJACENT TO ROUTE 0011 (BLUE MESA ROAD) AT MP 2.71 ON RIGHT			YES	PUBLIC	5,395	AS	2
0915	6	1	74130		NO NAME OVERLOOK PARKING	ADJACENT TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 1.70 ON RIGHT			YES	PUBLIC	7,247	AS	1
0916	6	1	74132		NEWSPAPER ROCK PARKING	FROM END OF ROUTE 0012 (NEWSPAPER ROCK ROAD)	TO PARKING		YES	PUBLIC	24,577	AS	1

# Cycle 6 NPS / RIP Route ID Report

(Numerical By Summary Route and Subcomponent #)



Shading Color Key

White = Paved Routes, DCV Driven

Grey = Paved Routes, DCV not Driven

Black = Non-NPS Routes

■ = Concession Route

Yellow = Unpaved Routes, DCV not Driven

Blue = Paved Parking Areas

Green = Unpaved Parking Areas

Red text denotes:

\*Unpaved route data was obtained from the NPS and was not collected by the Road Inventory Program (RIP).

DCV = Data Collection Vehicle  
 MRL = Manually Rated Line  
 MRP = Manually Rated Polygon  
 PKG = Parking Areas  
 NC = Not Collected

## PEFO Petrified Forest National Park

### PARKING AREA INVENTORY (1300 SERIES FMSS LOCATIONS)

Route No.	Cycle Collected	Iteration Collected	FMSS Number	Concession	Route Description		Maintenance District	FLTP	Access Level	Area (SQ FT)	Surf. Type	Area Map
					Route Name	From						
0917ZZ	6	1	74133		JASPER FOREST PARKING AREAS	ADJACENT TO ROUTE 0014 (JASPER FOREST ROAD) AT MP 0.38 ON RIGHT AND LEFT		YES	PUBLIC	17,812	AS	2
0919	6	1	74136		SOUTH AREA RANGER PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 26.30 ON RIGHT	TO PARKING	NO	NONPUBLIC	4,506	AS	2
0920	6	1	90618		PD MAINTENANCE AND ADMINISTRATION AREA PARKING	FROM ROUTE 0900 (PD VISITOR CENTER PARKING)	TO PARKING	NO	NONPUBLIC	53,408	AS	1
0921	6	1	232465		PDC GAS STATION PARKING	FROM ROUTE 0900 (PD VISITOR CENTER PARKING)	TO GAS STATION	YES	PUBLIC	12,625	AS	1
0922	NC		232474		RFC GIFT SHOP/MANAGERS RESIDENCE GRAVEL DRIVE AND PARKING	FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY)	TO ROUTE 0418 (RF LAGOON SERVICE ROAD)	NO	NONPUBLIC	6,949	GR	
0923	6	1	237649		HH PARKING 1	FROM HELICKSON DRIVE (NON NPS)	TO PARKING	NO	NONPUBLIC	5,367	CO	3
0924	6	1	237651		HH PARKING 2	FROM MORRIS LANE (NON NPS)	TO PARKING	NO	NONPUBLIC	4,070	CO	3

# Cycle 6 NPS / RIP Route ID Report

(Numerical By Summary Route and Subcomponent #)



Shading Color Key

White = Paved Routes, DCV Driven

Grey = Paved Routes, DCV not Driven

Black = Non-NPS Routes

■ = Concession Route

Yellow = Unpaved Routes, DCV not Driven

Blue = Paved Parking Areas

Green = Unpaved Parking Areas

Red text denotes:

\*Unpaved route data was obtained from the NPS and was not collected by the Road Inventory Program (RIP).

DCV = Data Collection Vehicle  
 MRL = Manually Rated Line  
 MRP = Manually Rated Polygon  
 PKG = Parking Areas  
 NC = Not Collected

## Cycle 6 Summary Totals for Petrified Forest National Park

Cycle 6 Route Totals			
	NPS Maintained	Concessionaire Maintained	Park Totals
Paved Roads, Data Collection Vehicle Rated (Miles)	34.93	0	34.93
Paved Roads, Manually Rated Length (Miles)	1.92	0	1.92
Paved Roads, Manually Rated Area (Sq. Ft.)	101,380	0	101,380
Unpaved Roads (Miles)	111.83	0	111.83
Paved Parking (Sq. Ft.)	598,027	0	598,027
Unpaved Parking (Sq. Ft.)	72,289	0	72,289

Cycle 6 Lane Miles and Overall Pavement Condition		
	Lanes Miles*	Pavement Condition Rating**
Data Collection Vehicle Routes	81.09	83
Manually Rated Roads	6.28	16
Parking Areas	10.30	71

\* Equivalent Lane Miles are calculated by route using the following equations:  
 - DCV and MRLs = (PAVE\_WIDTH x PAVED\_MI) / 11 foot lane  
 - MRPs and PKGs = SQ\_FEET / 5280 / 11 foot lane

\*\*Parking and Manually Rated Routes are assigned the following PCR values based on the type of observed distresses:  
 -Excellent = 97 -Good = 90 -Fair = 73  
 -Poor = 53, 30, or 0 -Construction / Not Rated = -1

# Cycle 6 NPS / RIP Route ID Report

(Numerical By Summary Route and Subcomponent #)



Shading Color Key

White = Paved Routes, DCV Driven

Grey = Paved Routes, DCV not Driven

Black = Non-NPS Routes

■ = Concession Route

Yellow = Unpaved Routes, DCV not Driven

Blue = Paved Parking Areas

Green = Unpaved Parking Areas

Red text denotes:

\*Unpaved route data was obtained from the NPS and was not collected by the Road Inventory Program (RIP).

DCV = Data Collection Vehicle  
 MRL = Manually Rated Line  
 MRP = Manually Rated Polygon  
 PKG = Parking Areas  
 NC = Not Collected

## General Park Road Functional Classification (FC) Table

FC	Type	User Access	Description	Route Numbers	Surface Types
1	Principal Park Road Rural Parkway	Public	Roads which constitute the main access route, circulatory tour, or thoroughfare for park visitors. Rural Parkways (e.g. Natchez Trace) are numbered 0001 - 0009.	0001 - 0009 0010 - 0099	AS - Asphaltic Concrete Pavement
2	Connector Park Road	Public	Roads which provide access within a park to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, etc.	0100 - 0199	BR - Brick or Pavers Road Bed CB - Cobble Stone Road Bed
3	Special Purpose Park Road	Public	Roads which provide circulation within public areas, such as campgrounds, picnic areas, visitor center complexes, concessionaire facilities, etc. These roads generally serve low-speed traffic and are often designed for one-way circulation.	0200 - 0299	CO - Portland Cement Concrete Pavement GR - Gravel Road Bed
4	Primitive Park Road	Public	Roads which provide circulation through remote areas and/or access to primitive campgrounds and undeveloped areas. These roads frequently have no minimum design standards and their use may be limited to specially equipped vehicles. Note: Functional Classes 3 and 4 have the same route numbers because, historically, they were numbered similarly.	0200 - 0299	NV - Native or Dirt Material Road Bed
5	Administrative Park Road	Public	All public roads intended for access to administrative developments or structures such as park offices, employee quarters, or utility areas.	0400 - 0499	OT - Other Materials Road Bed
6	Administrative Park Road (Restricted Access)	Nonpublic	All roads normally closed to the public, including patrol roads, truck trails, and other similar roads. Note: Functional Classes 5 and 6 have the same route numbers because historically they were numbered similarly and often there is little distinction between these routes. For example, because utility areas and employee housing are often closed to the public, this restriction would result in classification of FC 6 rather than FC 5.	0400 - 0499	
7	Urban Parkway	Public	These facilities serve high volumes of park and non-park related traffic and are restricted, limited-access facilities in an urban area. This category of roads primarily encompasses the major parkways which serve as gateways to our nation's capital. Other major park roads or portions thereof, however, may be included in this category.	0001 - 0009	
8	City Street	Public	City streets are usually extensions of the adjoining street system that are owned and maintained by the National Park Service. The construction and/or reconstruction should conform with accepted local engineering practice and local conditions.	0600 - 0699	
N/A	Non-NPS Roads	Public	State, County, or City owned roads which border, traverse, or provide access to Park Facilities or Locations. Non-NPS roads are not assigned functional classes and are driven for GPS and Video Log only.	5000 - 5999	

A park road system contains those roads within or giving access to a park or other unit of the NPS which are administered by the NPS, or by the Service in cooperation with other agencies. The assignment of a functional classification (FC) to a park road is not based on traffic volumes or design speed, but on the intended use or function of that road or route.

The historic route numbering system also included a 300 series for interpretive roads, and a 500 series for one-way roads. There are approximately 250 roads nationwide which are designated by the 300 and 500 series. The numbers for these roads will be maintained for reporting consistency. However, since these interpretive and one-way routes are not as clearly tied to a specific functional class, the 300 and 500 series will be discontinued for future use.

# NPS / RIP Subcomponent Details for PEFO

(Numerical By Summary Route and Subcomponent #)



Shading Color Key

White = Paved Routes, DCV Driven

Grey = Paved Routes, DCV not Driven

Black = Paved Routes, Non-NPS

■ = Concession Route

Yellow = Unpaved Routes, DCV not Driven

Blue = Paved Parking Areas

Green = Unpaved Parking Areas

Red text denotes:

\*Unpaved route data was obtained from the NPS and was not collected by the Road Inventory Program (RIP).

DCV = Data Collection Vehicle  
 MRL = Manually Rated Line  
 MRP = Manually Rated Polygon  
 PKG = Parking Areas  
 NC = Not Collected

## PEFO Petrified Forest National Park

### SUMMARY ROUTE INVENTORY FOR PARKING AREAS (1300 SERIES FMSS LOCATIONS)

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description		FLTP	User Access	Area (SQ FT)
						From	To			
0917ZZ	74133	6	1		JASPER FOREST PARKING AREAS	ADJACENT TO ROUTE 0014 (JASPER FOREST ROAD) AT MP 0.38 ON RIGHT AND LEFT		YES	PUBLIC	17,812

### PEFO-0917ZZ Subcomponent Breakdown

Route Number	FMSS Number	Cycle Collected	Iteration Collected	Concession	Route Name	Route Description		FLTP	User Access	Area (SQ FT)
						From	To			
0917AZ	74133	6	1		JASPER FOREST PARKING AREA A	ADJACENT TO ROUTE 0014 (JASPER FOREST ROAD) AT MP 0.39 ON RIGHT		YES	PUBLIC	11,199
0917BZ	74133	6	1		JASPER FOREST PARKING AREA B	ADJACENT TO ROUTE 0014 (JASPER FOREST ROAD) AT MP 0.38 ON LEFT		YES	PUBLIC	6,613



## Route Identification Changes to Paved Routes from Previous Cycle Petrified Forest National Park

ROUTES MODIFIED FROM PREVIOUS INVENTORY:			
Route No.	Route Name	Type of Change	Comments
0919	SOUTH AREA RANGER PARKING	ROUTE NAME	ROUTE NAME WAS CHANGED FROM "RFM EMPLOYEE PARKING" TO "SOUTH AREA RANGER PARKING" TO ALIGN WITH FMSS.
0923	HH PARKING 1	OTHER	USER ACCESS LEVEL WAS UPDATED TO NONPUBLIC DURING ROUTE ID MEETING.
0924	HH PARKING 2	OTHER	USER ACCESS LEVEL WAS UPDATED TO NONPUBLIC DURING ROUTE ID MEETING.

# Section 3 Park Summary Information



**Petrified Forest National Park**



**Federal Lands Highway  
Road Inventory Program**

# Parkwide Paved Route Condition Summary

## Petrified Forest National Park

Table 1: Paved Route Miles and Parking Area Square Footages by Access Level and PCR

### Breakdown of Pavement Condition Rating (PCR) Based on Access Level

	POOR (PCR of 0 - 60)	FAIR (PCR of 61 - 84)	GOOD (PCR of 85 - 94)	EXCELLENT (PCR of 95 -100)	
<b>PAVED ROADS</b>					
Functional Class	Length (miles)	Length (miles)	Length (miles)	Length (miles)	Total Mileage by FC
1	0.76	9.52	9.02	9.18	28.48
2	0.06	2.66	1.31	0.52	4.55
3					
4					
5					
6	4.48	0.21			4.69
7					
8					
<b>Total Mileage by PCR</b>	<b>5.30</b>	<b>12.39</b>	<b>10.33</b>	<b>9.70</b>	<b>37.72</b>
<b>PAVED PARKING</b>					
Access Level	Area (sq. ft.)	Area (sq. ft.)	Area (sq. ft.)	Area (sq. ft.)	Total Area
PUBLIC	221,936	152,620	156,120		530,676
NONPUBLIC	4,506	9,437	53,408		67,351
<b>Total Area by PCR</b>	<b>226,442</b>	<b>162,057</b>	<b>209,528</b>	<b>0</b>	<b>598,027</b>

**NOTES:**

1. Data are reported in the table only for paved roads and parking lots that received a condition rating.
2. Non-linear roads (MRP collected routes) are measured by area and converted to equivalent route miles based on a 22-ft pavement width in order to be included in the mileage totals for paved roads shown above.
3. Quantities in the table above are derived from the route condition data within the PMS\_20, PMS\_MRL, PMS\_MRP, and PMS\_PKG tables in the Park geodatabase.

### Parkwide Condition Percentages

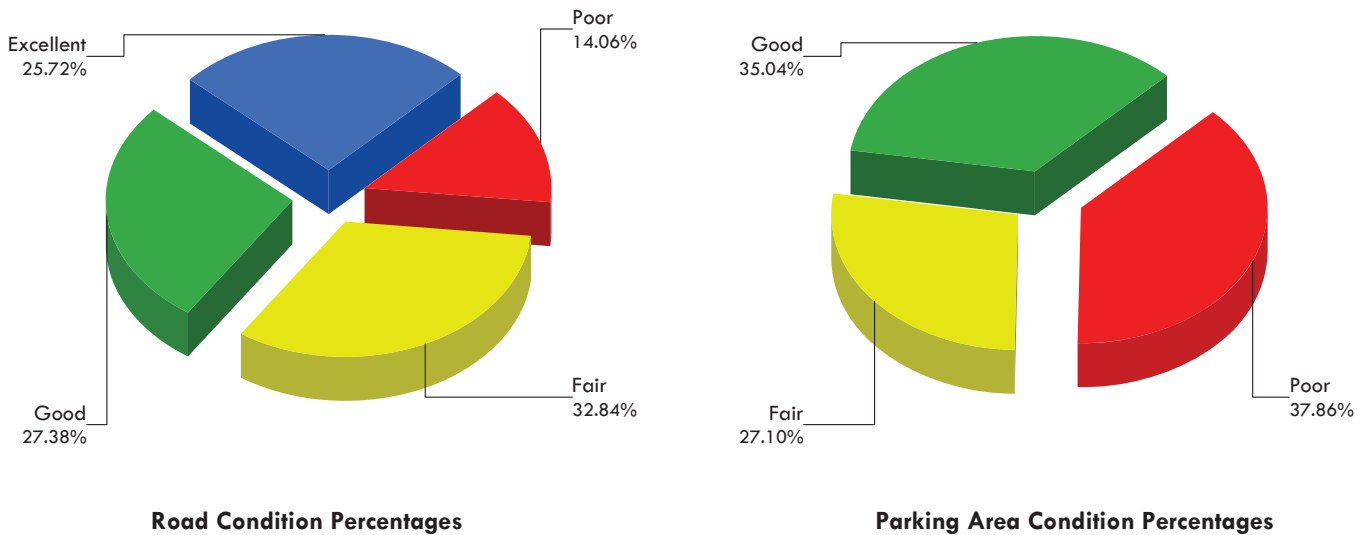
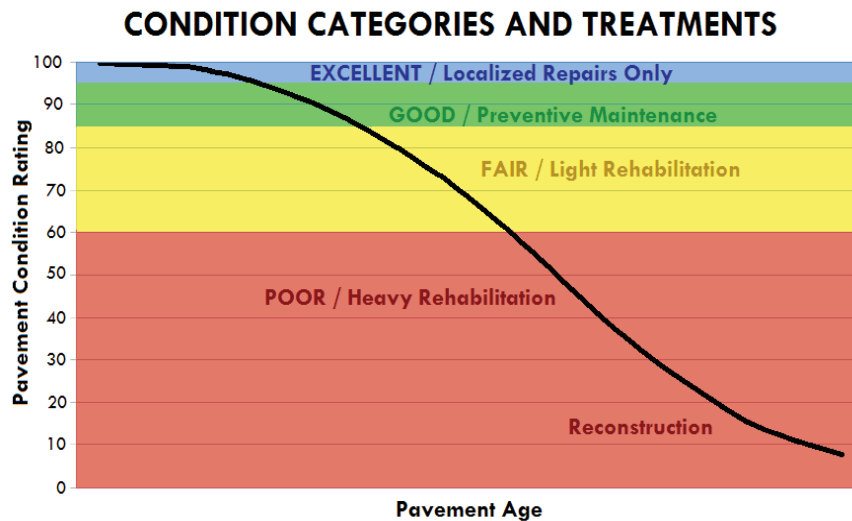


Figure 1: Pavement Condition Rating Breakdown for Paved Roads and Parking Areas

## Explanation of the Excellent, Good, Fair, and Poor Condition Descriptions

The Road Inventory Program aims to provide assistance in translating the excellent / good / fair / poor rating categories into pavement needs categories. The PCR can be used to indicate the place in the Pavement Life Cycle and the type of treatments that should be considered now and into the future.

- Excellent / New: PCR of 95-100
  - o Pavements in this range will require only spot repairs
- Good: PCR of 85-94
  - o Pavements in this range will likely be candidates for Preventive Maintenance. Examples include Chip and Slurry Seals, Micro Surfacing and Thin Overlays.
- Fair: PCR of 61-84
  - o Pavements in this range will likely be candidates of Light Rehabilitation (L3R). Examples include singlelift overlays up to 2.5 inches in total thickness, milling and overlays.
- Poor: PCR of 0-60
  - o Pavements in this range will likely be candidates of Heavy Rehabilitation or Reconstruction (H3R or 4R). Examples include Pulverization, Multiple Lift Overlays, and Reconstruction.



At this time, specific Maintenance and Rehabilitation activities should be evaluated and recommended at the project level. Site-specific conditions that influence treatment type should be determined based on performing a subsurface investigation and/or pavement condition survey, and not be based solely on RIP data. Additionally, RIP produces a snapshot of conditions at the time in which the data were collected. For further information or to obtain additional Pavement Management System's data from our Highway Pavement Management Application (HPMA) please contact the Eastern Federal Lands pavement team.



## Cycle 6 - Road Inventory Program Road Condition Summary Report for Data Collection Vehicle (DCV) Rated Roads

### Petrified Forest National Park

**Condition (Rating / Index) Legend**

EXCELLENT (95 - 100)
GOOD (85 - 94)
FAIR (61 - 84)
POOR (0 - 60)
NR = NOT RATED

- Notes:
- This condition summary report contains only the roads rated with the Data Collection Vehicle (DCV).
  - Condition on roads that were manually rated and parking areas are shown in separate reports.
  - Additional details on individual road ratings can be found in Section 5 of the Cycle 6 RIP Report.
  - Refer to the RIP Report Appendix for an explanation of the rating system and rating methods.

#### Route-Level Condition for Roads Rated with the Data Collection Vehicle (DCV)

Route No.	FMSS No.	Route Name	Functional Class	Surf. Type	Paved Length (Miles)	Pavement Condition Rating (PCR)	Roughness Condition Index (RCI)	Surface Condition Rating (SCR)	Structural Crack Index	Alligator Crack Index	Longitudinal Cracking Index	Transverse Cracking Index	Patch / Pothole Index	Rutting Index
PEFO-0010	74016	NORTH-SOUTH HIGHWAY	1	AS	28.48	87	77	93	99	100	99	99	100	93
PEFO-0011	74031	BLUE MESA ROAD	2	AS	3.45	79	59	92	99	100	99	92	100	94
PEFO-0012	74032	NEWSPAPER ROCK ROAD	2	AS	0.25	93	NR	93	99	100	99	98	100	93
PEFO-0014	74034	JASPER FOREST ROAD	2	AS	0.51	88	74	98	100	100	100	98	100	98
PEFO-0200	74036	CHINDE POINT ACCESS ROAD	2	AS	0.34	87	NR	87	99	100	99	87	100	98
PEFO-0409	74042	OLD ROUTE 180 NORTH	6	AS	1.90	13	33	0	0	0	0	11	91	85



## Cycle 6 - Road Inventory Program Road Condition Summary Report for Manually Rated Roads

**Condition (Rating / Index) Legend**

EXCELLENT (95 - 100)
GOOD (85 - 94)
FAIR (61 - 84)
POOR (0 - 60)
NR = NOT RATED

### Petrified Forest National Park

- Notes:
- This condition summary report contains only the roads that were manually rated.
    - MRL = Manually Rated Line (a linear road)
    - MRP = Manually Rated Polygon (a non-linear road)
  - Condition on roads that were rated with the Data Collection Vehicle (DCV) are shown in a separate report.
  - A road is manually rated when it is determined to be unsuitable for the DCV to drive.
  - Additional details on individual road ratings can be found in Section 5 of the Cycle 6 RIP Report.
  - Refer to the RIP Report Appendix for an explanation of the rating system and rating methods.

#### Route-Level Condition for Manually Rated Line (MRL) Roads

Route No.	FMSS No.	Route Name	Functional Class	Surf. Type	Paved Length (Miles)	Pavement Condition Rating (PCR)	Roughness Condition Index (RCI)	Surface Condition Rating (SCR)	Structural Crack Index	Alligator Crack Index	Longitudinal Cracking Index	Transverse Cracking Index	Patch / Pothole Index	Rutting Index
PEFO-0419	237643	OLD ROUTE 180 EAST	6	AS	1.92	0	NR	0	NR	NR	NR	NR	NR	NR

#### Route-Level Condition for Manually Rated Polygon (MRP) Roads

Route No.	FMSS No.	Route Name	Functional Class	Surf. Type	Area (Sq. Ft.)	Pavement Condition Rating (PCR)	Asphalt Surface Distresses					Concrete Surface Distresses				
							Alligator Cracking	Longitudinal / Transverse Cracking	Rutting / Distortions	Potholes / Patching	HMA Patching	Surface Raveling / Bleeding	Joint Faulting	Slab Cracking	Joint Distresses	Delamination / Pop-Outs
PEFO-0415	74063	PD RESIDENCE AREA	6	AS	81,730	53	90	53	90	90	90	90				
PEFO-0416	74070	RF SOUTH RESIDENCE AREA	6	AS	19,650	73	90	90	73	90	97	73				



Federal Lands Highway  
Road Inventory Program

# Cycle 6 - Road Inventory Program

## Parking Area Condition Summary Report

### Petrified Forest National Park

**Condition (Rating / Index) Legend**

EXCELLENT (97)
GOOD (90)
FAIR (73)
POOR* (0, 30, 53)
NR = NOT RATED

- Notes:
- A PCR of 0 indicates a paved parking area in very poor condition. Individual distresses could not be identified.
  - Additional details on individual parking areas can be found in Section 6 of the Cycle 6 RIP Report.
  - Refer to the RIP Report Appendix for an explanation of the rating system and rating methods.

Route No.	FMSS No.	Route Name	User Access	Surf. Type	Area (Sq. Ft.)	Pavement Condition Rating (PCR)	Asphalt Surface Distresses					Concrete Surface Distresses						
							Alligator Cracking	Longitudinal / Transverse Cracking	Rutting / Distortions	Potholes / Patching	HMA Patching	Surface Raveling / Bleeding	Joint Faulting	Slab Cracking	Joint Distresses	Delamination / Pop-Outs	Potholes / Patching	
PEFO-0900	74073	PD VISITOR CENTER PARKING	PUBLIC	AS	90,188	90	97	90	90	97	90	90						
PEFO-0901	74076	RF MUSEUM AND PICNIC PARKING	PUBLIC	AS	73,641	73	90	90	90	97	73	73						
PEFO-0902	74080	CRYSTAL FOREST PARKING	PUBLIC	AS	22,519	90	97	97	97	97	97	90						
PEFO-0904	74086	AGATE BRIDGE PARKING	PUBLIC	AS	23,965	73	97	90	97	97	97	73						
PEFO-0905	74088	TIPONI POINT PARKING	PUBLIC	AS	39,281	53	90	53	90	97	97	90						
PEFO-0906	74092	TAWA POINT PARKING	PUBLIC	AS	30,360	53	97	53	90	97	97	90						
PEFO-0907	74095	KACHINA POINT PARKING	PUBLIC	AS	43,553	53	90	53	90	90	97	90						
PEFO-0908	74101	PINTADO POINT PARKING	PUBLIC	AS	17,188	53	73	53	73	90	97	90						
PEFO-0909	74103	NIZHONI POINT PARKING	PUBLIC	AS	22,823	53	90	53	90	97	97	90						
PEFO-0910	74105	WHIPPLE POINT PARKING	PUBLIC	AS	21,571	53	97	53	97	97	97	90						
PEFO-0911	74107	LACEY POINT PARKING	PUBLIC	AS	14,583	53	90	53	90	90	97	90						
PEFO-0912	74110	PUERCO PUEBLO PARKING	PUBLIC	AS	38,018	90	97	90	90	97	97	90						
PEFO-0913	74113	NORTH ENTRANCE PARKING	PUBLIC	AS	25,330	53	97	53	90	97	97	90						
PEFO-0914	74120	BLUE MESA LOOP TRAIL PARKING	PUBLIC	AS	5,395	90	90	90	90	97	97	97						
PEFO-0915	74130	NO NAME OVERLOOK PARKING	PUBLIC	AS	7,247	53	97	53	73	97	97	90						
PEFO-0916	74132	NEWSPAPER ROCK PARKING	PUBLIC	AS	24,577	73	97	90	97	97	97	73						
PEFO-0917AZ	74133	JASPER FOREST PARKING AREA A	PUBLIC	AS	11,199	73	97	90	97	97	97	73						
PEFO-0917BZ	74133	JASPER FOREST PARKING AREA B	PUBLIC	AS	6,613	73	90	90	73	97	97	90						
PEFO-0919	74136	SOUTH AREA RANGER PARKING	NONPUBLIC	AS	4,506	53	90	53	73	90	73	73						
PEFO-0920	90618	PD MAINTENANCE AND ADMINISTRATION AREA PARKING	NONPUBLIC	AS	53,408	90	97	90	90	90	97	90						
PEFO-0921	232465	PDC GAS STATION PARKING	PUBLIC	AS	12,625	73	90	90	90	73	90	90						
PEFO-0923	237649	HH PARKING 1	NONPUBLIC	CO	5,367	73							90	73	73	73	97	
PEFO-0924	237651	HH PARKING 2	NONPUBLIC	CO	4,070	73							73	73	90	90	97	

# Section 4 Park Route Location Maps



**Petrified Forest National Park**



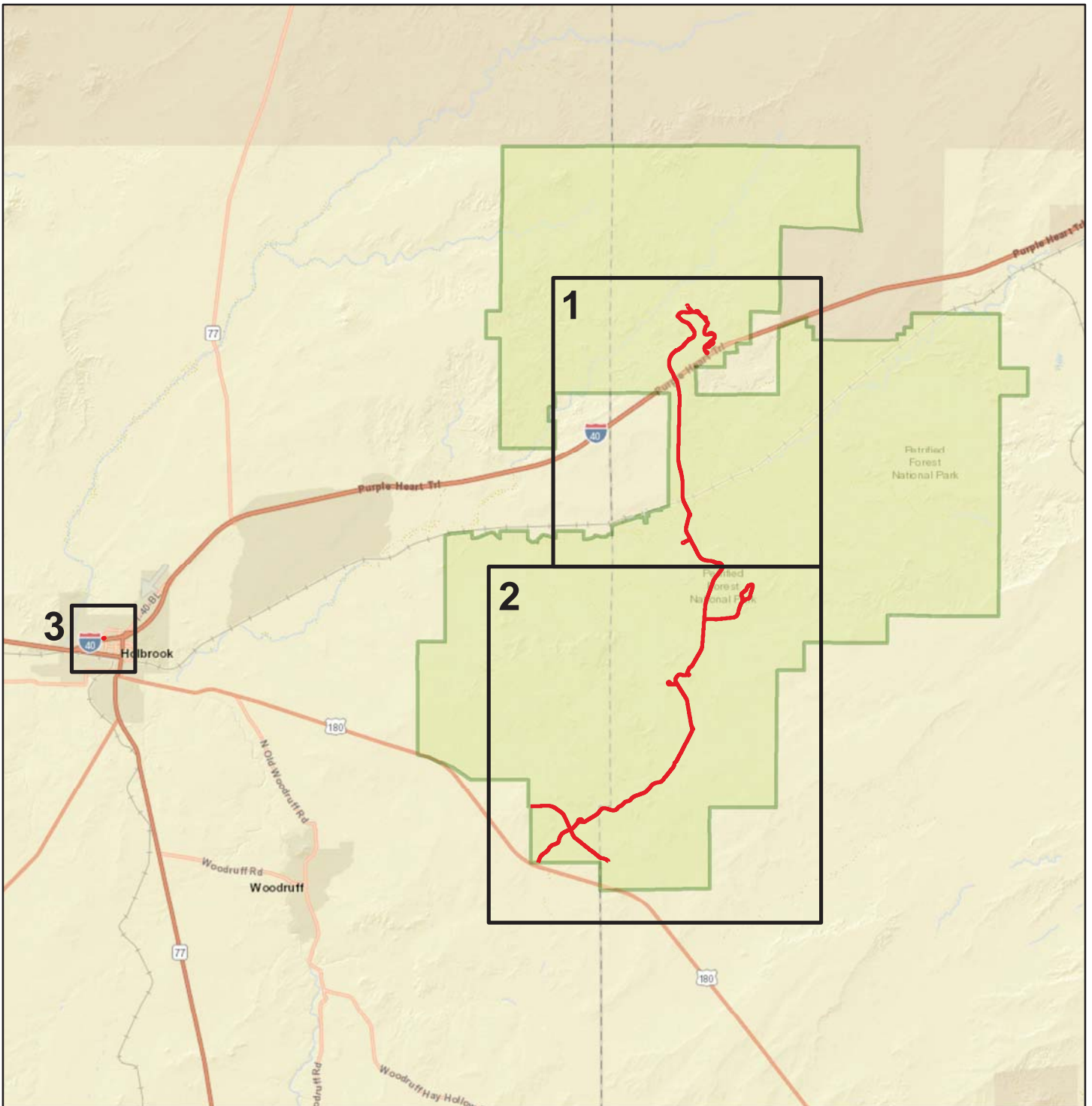
**Federal Lands Highway  
Road Inventory Program**



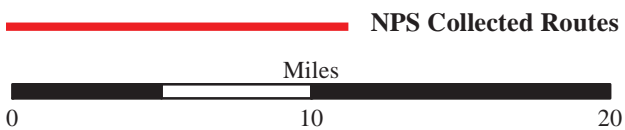
# Petrified Forest National Park

## ROUTE LOCATION MAP

### Key Map



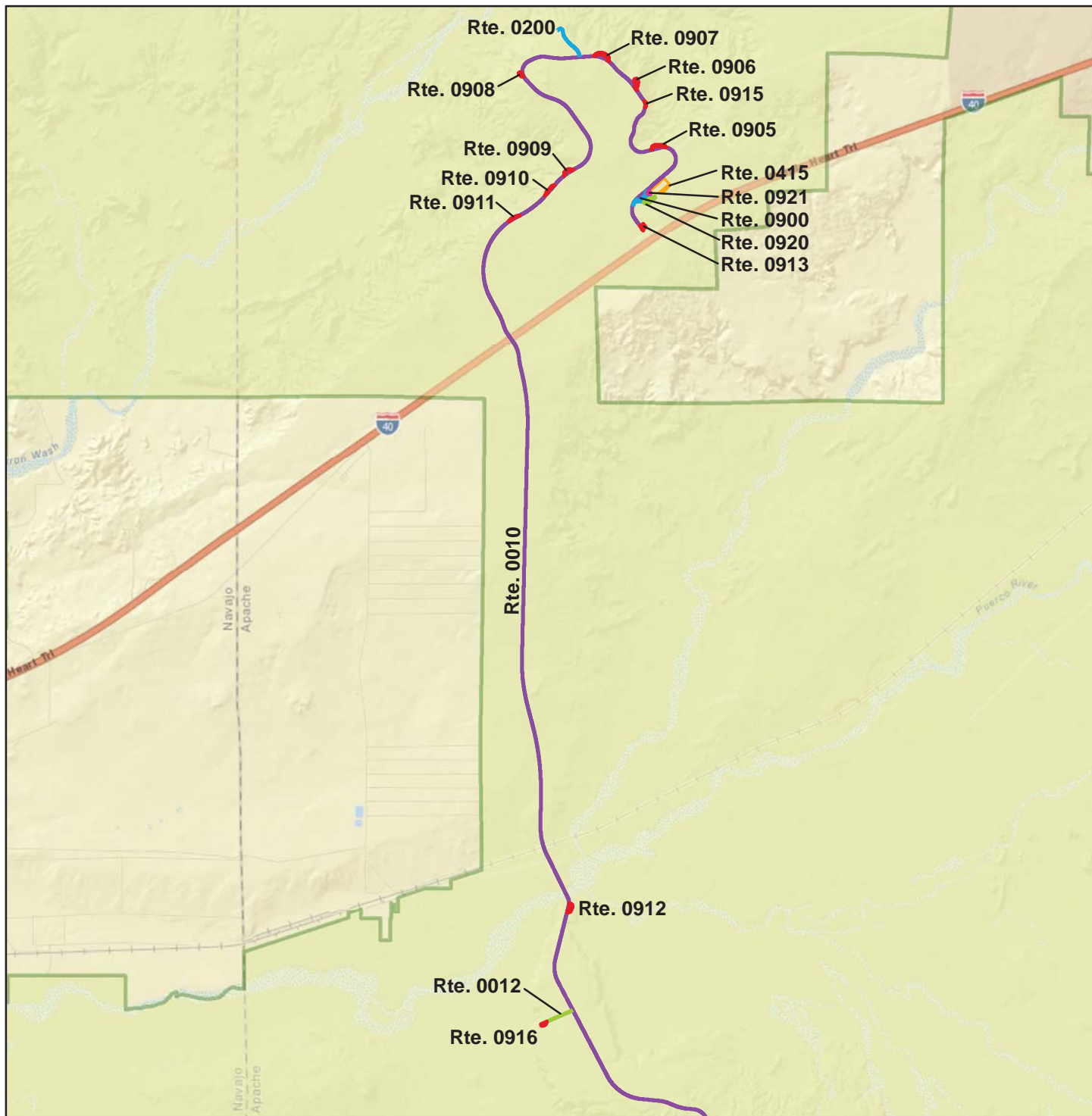
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



# Petrified Forest National Park

## ROUTE LOCATION MAP

### Map 1



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

**Note: Unique colors are used to differentiate roads**



# Petrified Forest National Park

## ROUTE LOCATION MAP

### Map 2



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

**Note: Unique colors are used to differentiate roads**



# Petrified Forest National Park

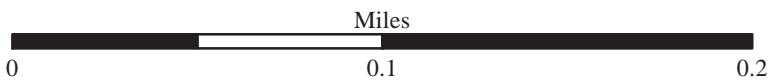
## ROUTE LOCATION MAP

### Map 3



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

**Note: Unique colors are used to differentiate roads**

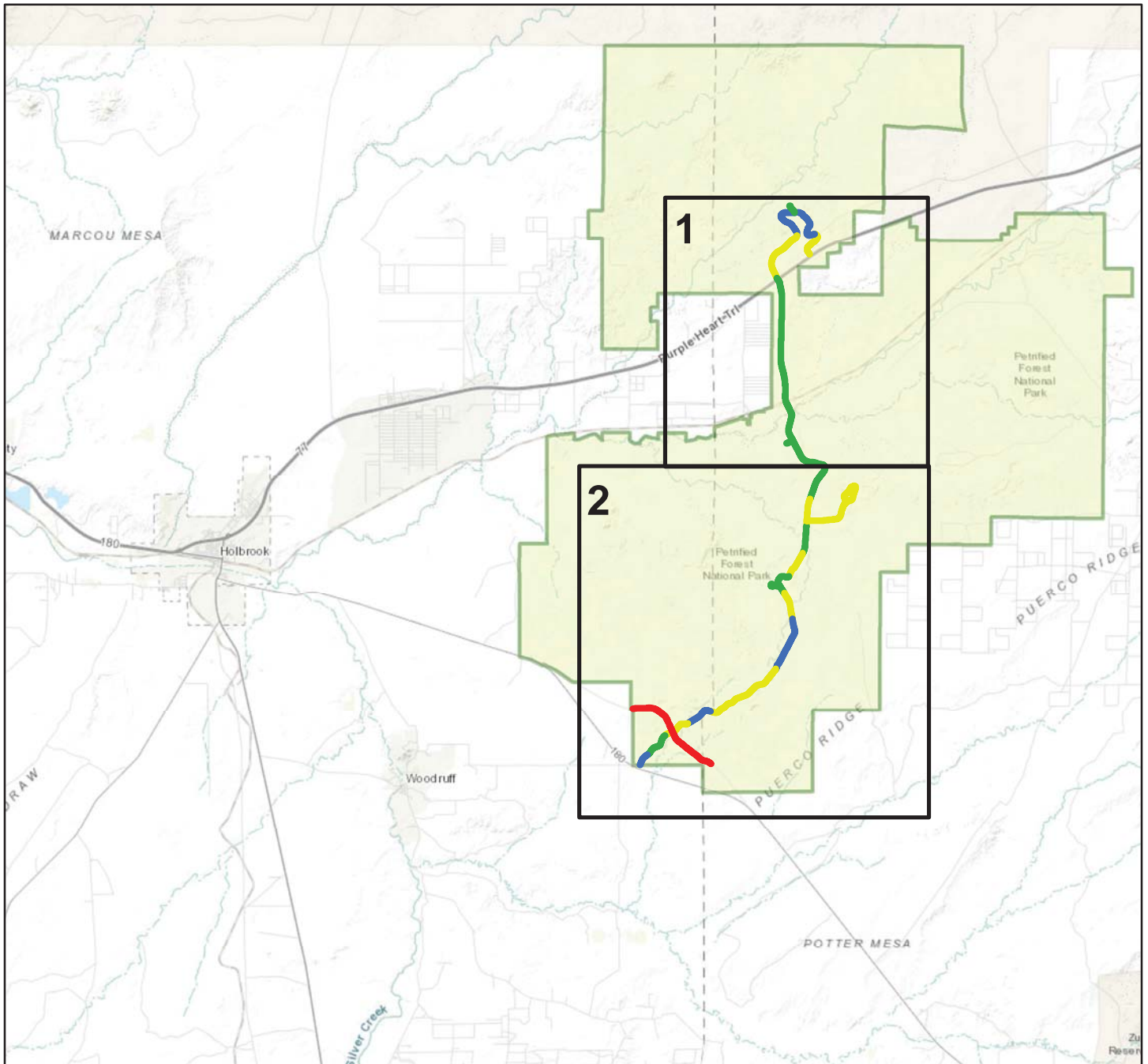


# Petrified Forest National Park

## ROUTE CONDITION MAP

### PCR - MILE BY MILE

#### Key Map



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

#### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas

Only Data Collection Vehicle and Manually Rated Roads are displayed

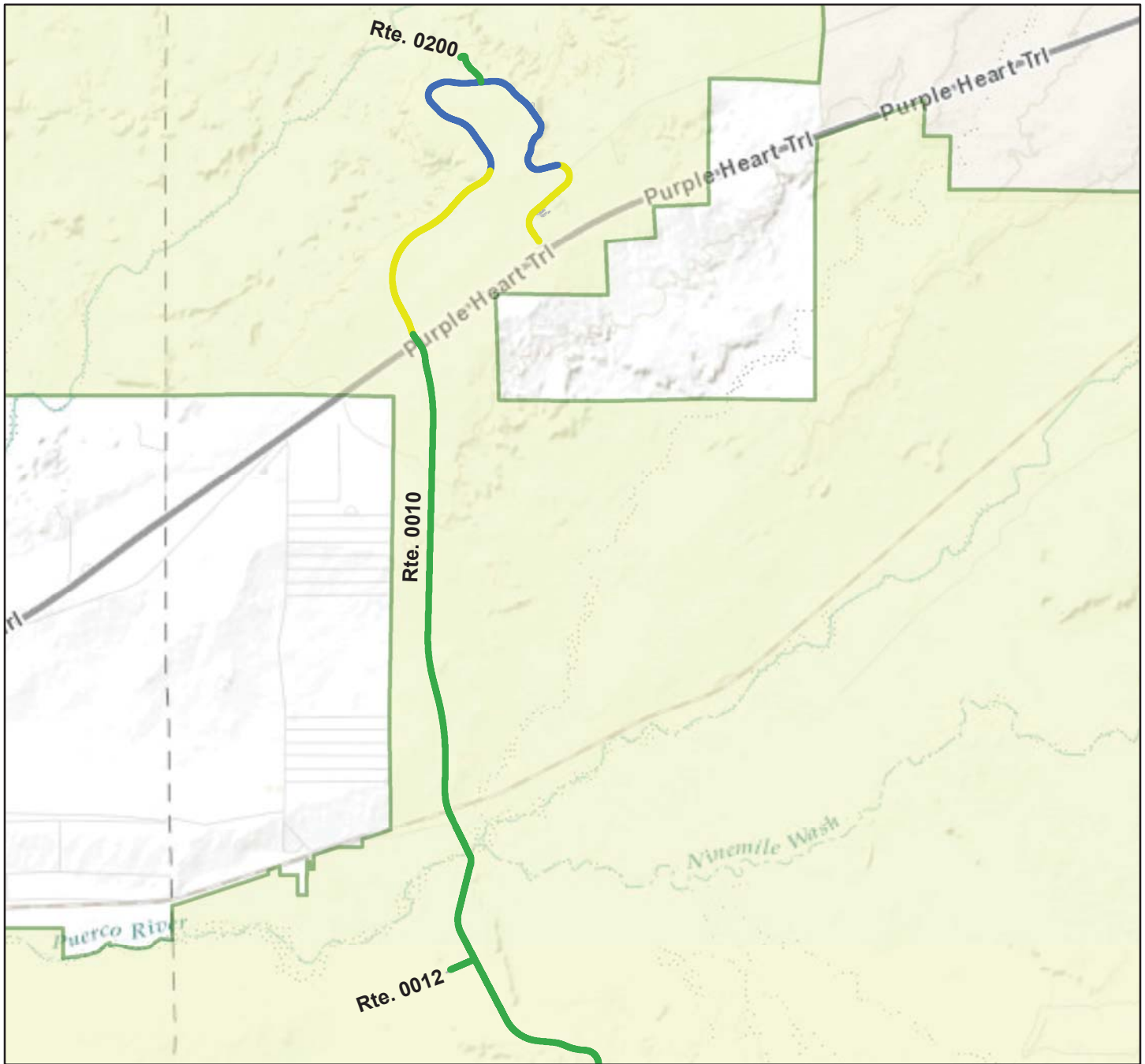


# Petrified Forest National Park

## ROUTE CONDITION MAP

### PCR - MILE BY MILE

#### Map 1

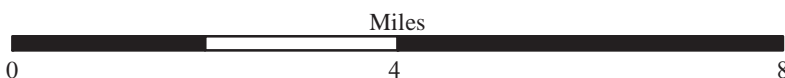


Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

#### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated
---------------	---------------	----------------	----------------------	-----------

See Appendix for definitions and formulas  
Only Data Collection Vehicle and Manually Rated Roads are displayed

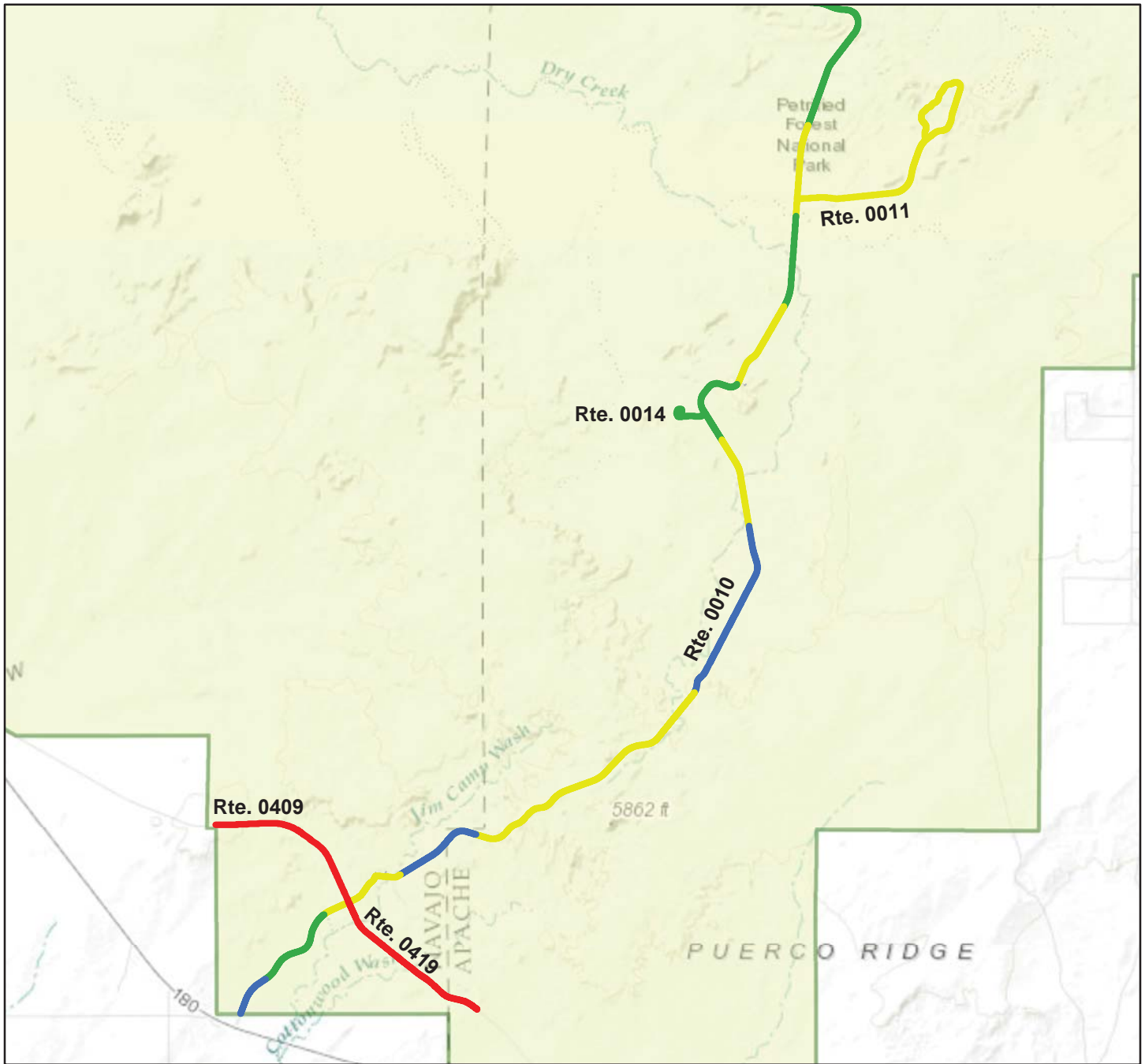


# Petrified Forest National Park

## ROUTE CONDITION MAP

### PCR - MILE BY MILE

#### Map 2



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated
---------------	---------------	----------------	----------------------	-----------

See Appendix for definitions and formulas  
Only Data Collection Vehicle and Manually Rated Roads are displayed



# Section 5 Paved Road Condition Rating Sheets



**Petrified Forest National Park**



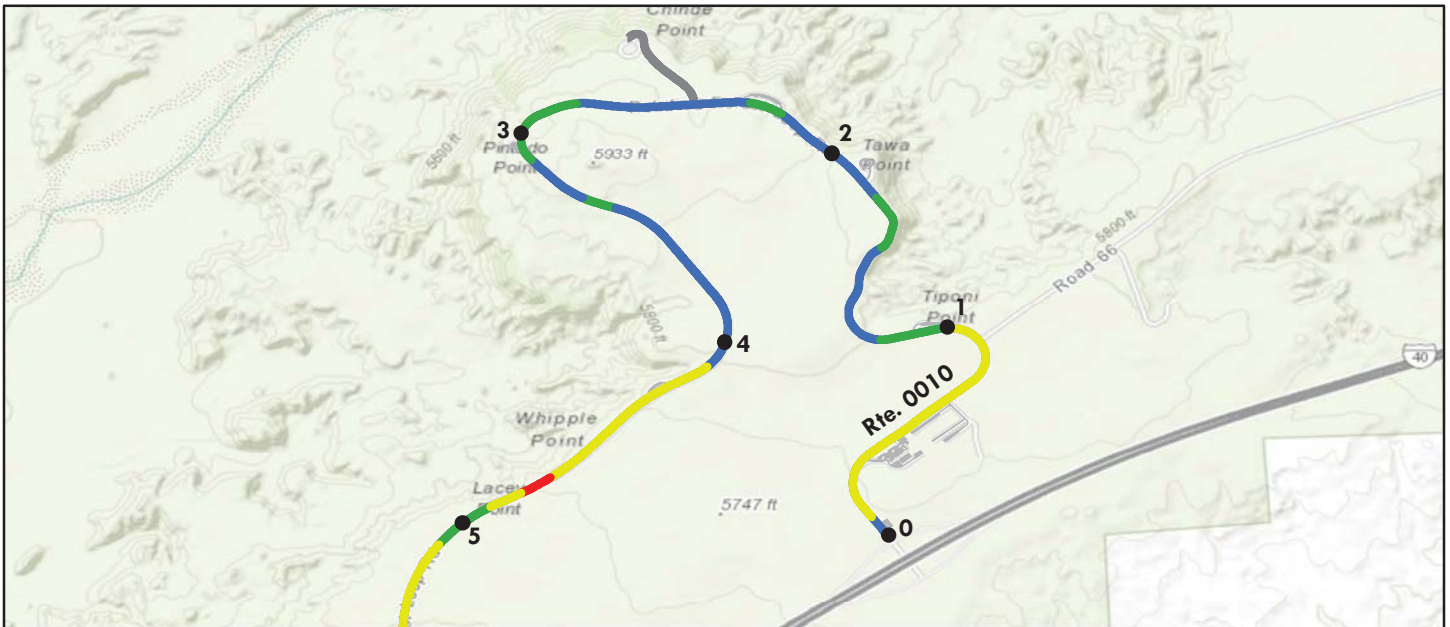
**Federal Lands Highway  
Road Inventory Program**



# Petrified Forest National Park

## ROUTE 0010: NORTH-SOUTH HIGHWAY

### Data Collection Vehicle (DCV) Rating



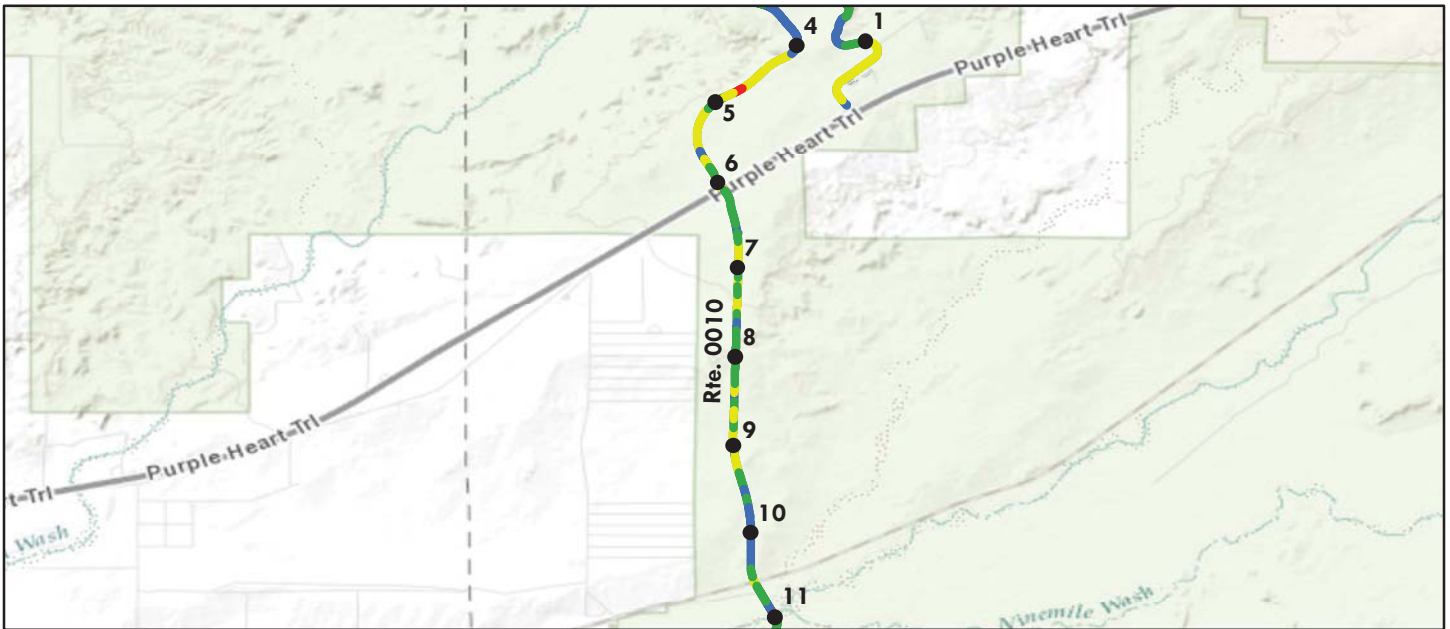
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	0	1	2	3	4
<b>Paved Length (Miles):</b> 28.48	<b>Section Length (MI)</b>	1	1	1	1	1
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	87	79	98	96	97	78
Surface Condition Rating (SCR)	93	91	99	97	97	95
Roughness Condition Index (RCI)	77	62	96	95	97	53
<b>Distress Index Values</b>						
Structural Crack Index	99	100	100	100	100	100
Alligator Crack Index	100	100	100	100	100	100
Longitudinal Crack Index	99	100	100	100	100	100
Transverse Cracking Index	99	98	99	99	100	98
Patching Index	100	100	100	100	100	100
Rutting Index	93	91	99	97	97	95
International Roughness Index (IRI)	178	233	125	126	121	270
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	26.8	31.4	27.7	26.8	27.9	25
Lane Width (ft)	9.9	11.5	10.4	10.3	10.6	10.3

# Petrified Forest National Park

## ROUTE 0010: NORTH-SOUTH HIGHWAY

### Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	5	6	7	8	9
<b>Paved Length (Miles):</b> 28.48	<b>Section Length (MI)</b>	1	1	1	1	1
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	87	83	85	86	86	88
Surface Condition Rating (SCR)	93	95	94	89	91	89
Roughness Condition Index (RCI)	77	65	71	81	78	87
<b>Distress Index Values</b>						
Structural Crack Index	99	100	99	100	100	100
Alligator Crack Index	100	100	100	100	100	100
Longitudinal Crack Index	99	100	99	100	100	100
Transverse Cracking Index	99	98	99	100	100	100
Patching Index	100	100	100	100	100	100
Rutting Index	93	95	94	89	91	89
International Roughness Index (IRI)	178	218	199	165	176	150
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	26.8	26.2	27.6	25	24.5	25.5
Lane Width (ft)	9.9	10.1	9.3	9.4	9.4	9.4

# Petrified Forest National Park

## ROUTE 0010: NORTH-SOUTH HIGHWAY

### Data Collection Vehicle (DCV) Rating



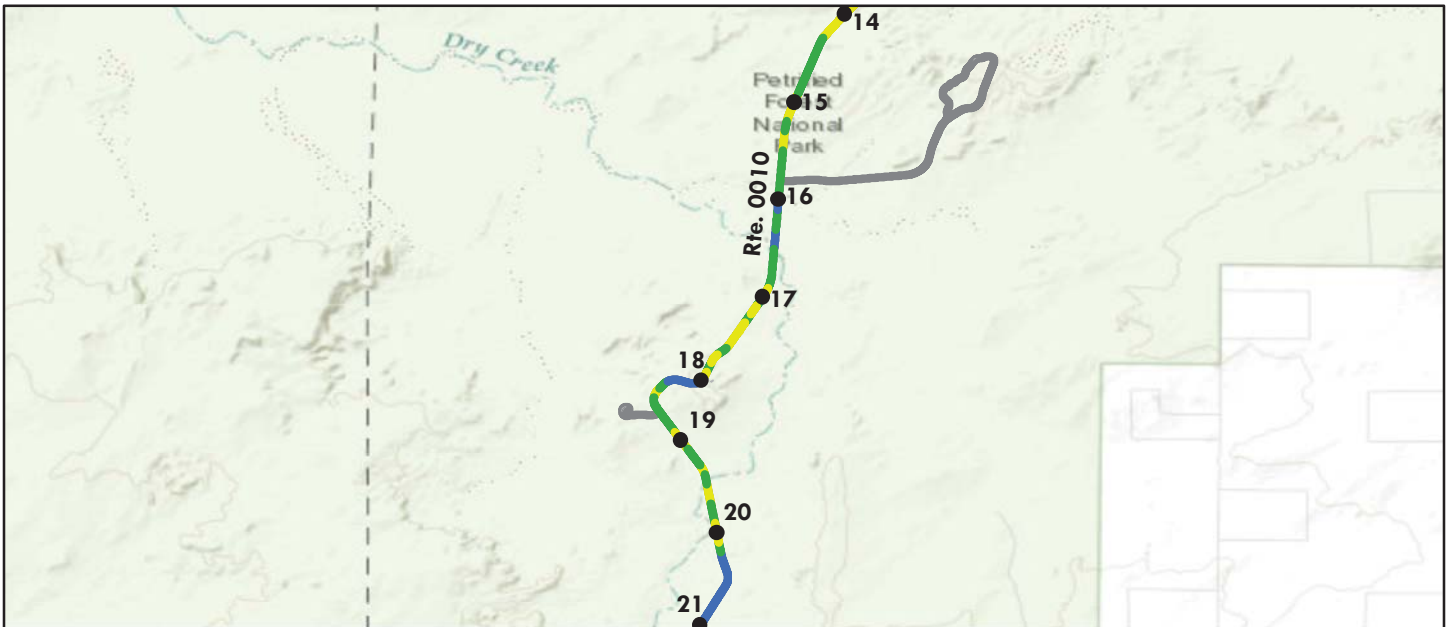
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	10	11	12	13	14
<b>Paved Length (Miles):</b> 28.48	<b>Section Length (MI)</b>	1	1	1	1	1
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	87	93	91	88	89	86
Surface Condition Rating (SCR)	93	97	91	85	93	86
Roughness Condition Index (RCI)	77	87	91	93	83	86
<b>Distress Index Values</b>						
Structural Crack Index	99	100	100	100	100	100
Alligator Crack Index	100	100	100	100	100	100
Longitudinal Crack Index	99	100	100	100	100	100
Transverse Cracking Index	99	98	99	100	100	100
Patching Index	100	100	100	100	100	100
Rutting Index	93	97	91	85	93	86
International Roughness Index (IRI)	178	148	138	132	161	152
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	26.8	28.6	25.7	25.7	26.1	25.5
Lane Width (ft)	9.9	9.6	9.3	9.5	9.5	10

# Petrified Forest National Park

## ROUTE 0010: NORTH-SOUTH HIGHWAY

### Data Collection Vehicle (DCV) Rating



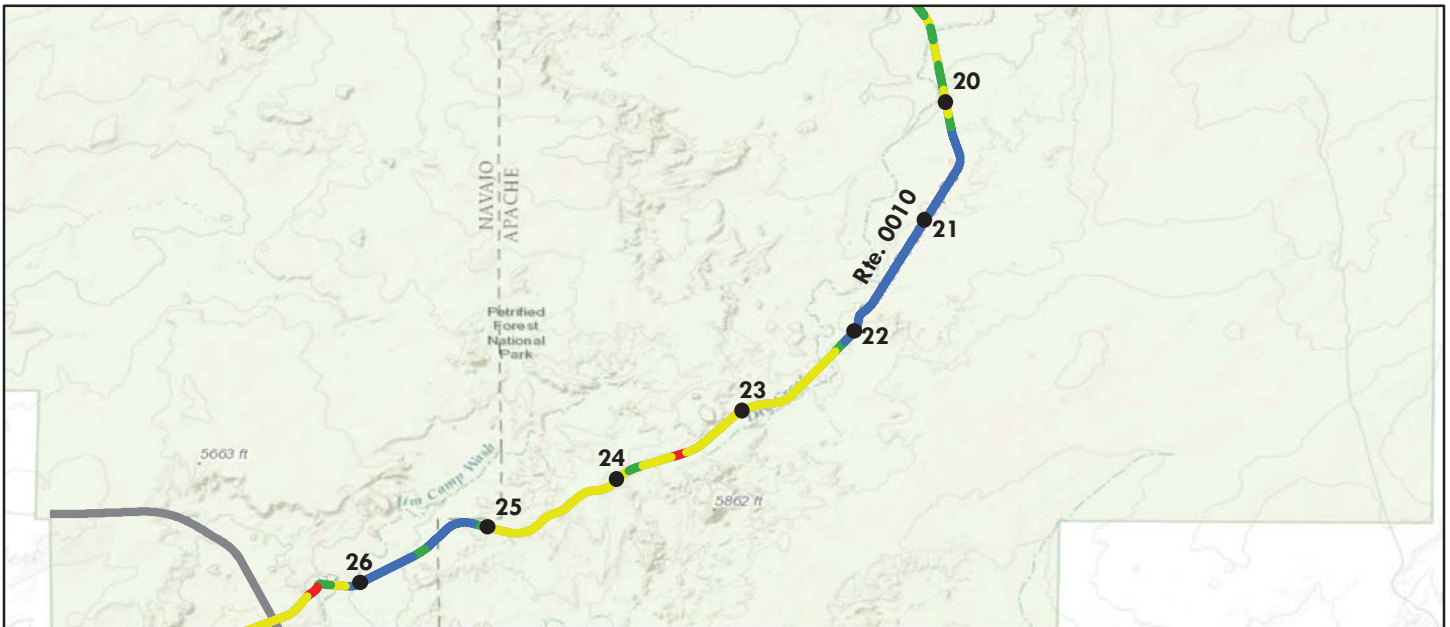
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	15	16	17	18	19
<b>Paved Length (Miles):</b> 28.48	<b>Section Length (MI)</b>	1	1	1	1	1
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	87	83	93	81	91	84
Surface Condition Rating (SCR)	93	87	96	93	97	95
Roughness Condition Index (RCI)	77	78	88	64	81	67
<b>Distress Index Values</b>						
Structural Crack Index	99	100	97	93	100	100
Alligator Crack Index	100	100	100	100	100	100
Longitudinal Crack Index	99	100	97	93	100	100
Transverse Cracking Index	99	100	96	97	97	96
Patching Index	100	100	100	100	100	100
Rutting Index	93	87	99	98	99	95
International Roughness Index (IRI)	178	176	146	222	166	212
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	26.8	26.1	26.6	29.7	26.3	27.4
Lane Width (ft)	9.9	9.6	9.8	9.7	9.6	9.9

# Petrified Forest National Park

## ROUTE 0010: NORTH-SOUTH HIGHWAY

### Data Collection Vehicle (DCV) Rating



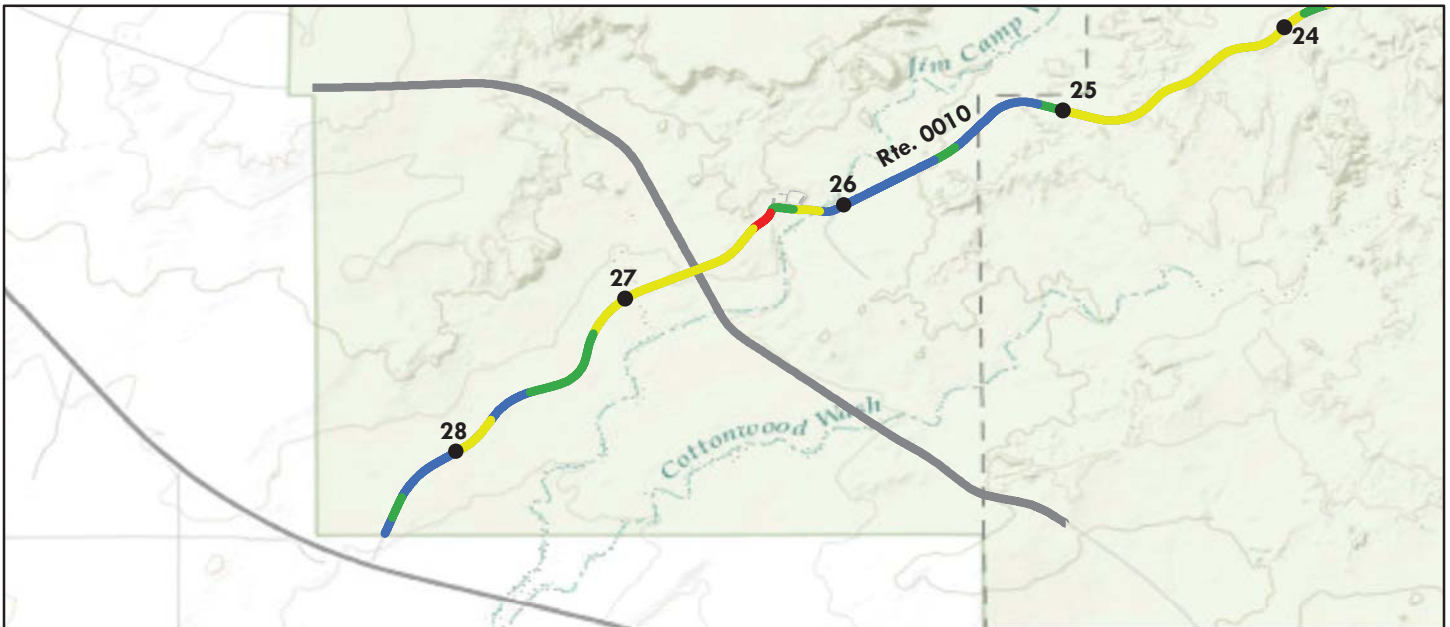
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	20	21	22	23	24
<b>Paved Length (Miles):</b> 28.48	<b>Section Length (MI)</b>	1	1	1	1	1
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	87	99	100	74	71	75
Surface Condition Rating (SCR)	93	99	100	88	87	91
Roughness Condition Index (RCI)	77	100	100	53	46	51
<b>Distress Index Values</b>						
Structural Crack Index	99	100	100	100	99	100
Alligator Crack Index	100	100	100	100	100	100
Longitudinal Crack Index	99	100	100	100	99	100
Transverse Cracking Index	99	99	100	100	96	98
Patching Index	100	100	100	100	99	100
Rutting Index	93	99	100	88	87	91
International Roughness Index (IRI)	178	94	82	270	305	279
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2	2	2	2
Paved Width (ft)	26.8	27.5	26.7	26.2	26.3	25.2
Lane Width (ft)	9.9	9.6	9.4	9.8	9.9	9.7

# Petrified Forest National Park

## ROUTE 0010: NORTH-SOUTH HIGHWAY

### Data Collection Vehicle (DCV) Rating



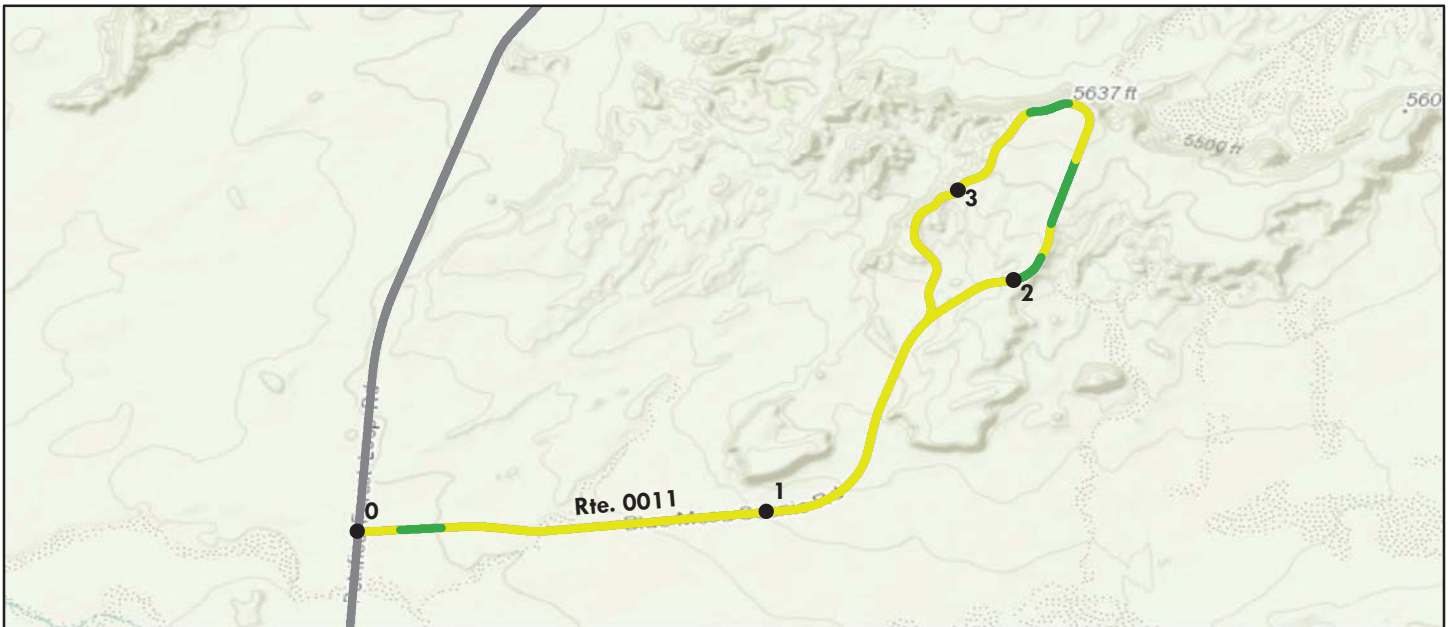
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	25	26	27	28	
<b>Paved Length (Miles):</b> 28.48	<b>Section Length (MI)</b>	1	1	1	0.48	
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	87	97	76	88	95	
Surface Condition Rating (SCR)	93	99	90	94	97	
Roughness Condition Index (RCI)	77	93	56	79	93	
<b>Distress Index Values</b>						
Structural Crack Index	99	100	99	99	97	
Alligator Crack Index	100	100	100	100	100	
Longitudinal Crack Index	99	100	99	99	97	
Transverse Cracking Index	99	100	99	100	100	
Patching Index	100	99	100	100	100	
Rutting Index	93	99	90	94	99	
International Roughness Index (IRI)	178	132	257	171	131	
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2	2	2	
Paved Width (ft)	26.8	25.4	28.6	28.7	25.8	
Lane Width (ft)	9.9	9.5	10.4	10.3	9.9	

# Petrified Forest National Park

## ROUTE 0011: BLUE MESA ROAD

### Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	0	1	2	3	
<b>Paved Length (Miles):</b> 3.45	<b>Section Length (MI)</b>	1	1	1	0.45	
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	79	78	79	82	71	
Surface Condition Rating (SCR)	92	93	93	90	89	
Roughness Condition Index (RCI)	59	55	59	71	44	
<b>Distress Index Values</b>						
Structural Crack Index	99	99	99	100	100	
Alligator Crack Index	100	100	100	100	100	
Longitudinal Crack Index	99	99	99	100	100	
Transverse Cracking Index	92	93	93	90	95	
Patching Index	100	99	100	100	100	
Rutting Index	94	96	96	94	89	
International Roughness Index (IRI)	245	260	244	200	317	
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2	1	1	
Paved Width (ft)	20	25.3	22.8	14.6	14	
Lane Width (ft)	12.4	10.5	11.5	14.6	14	

# Petrified Forest National Park

## ROUTE 0012: NEWSPAPER ROCK ROAD

### Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

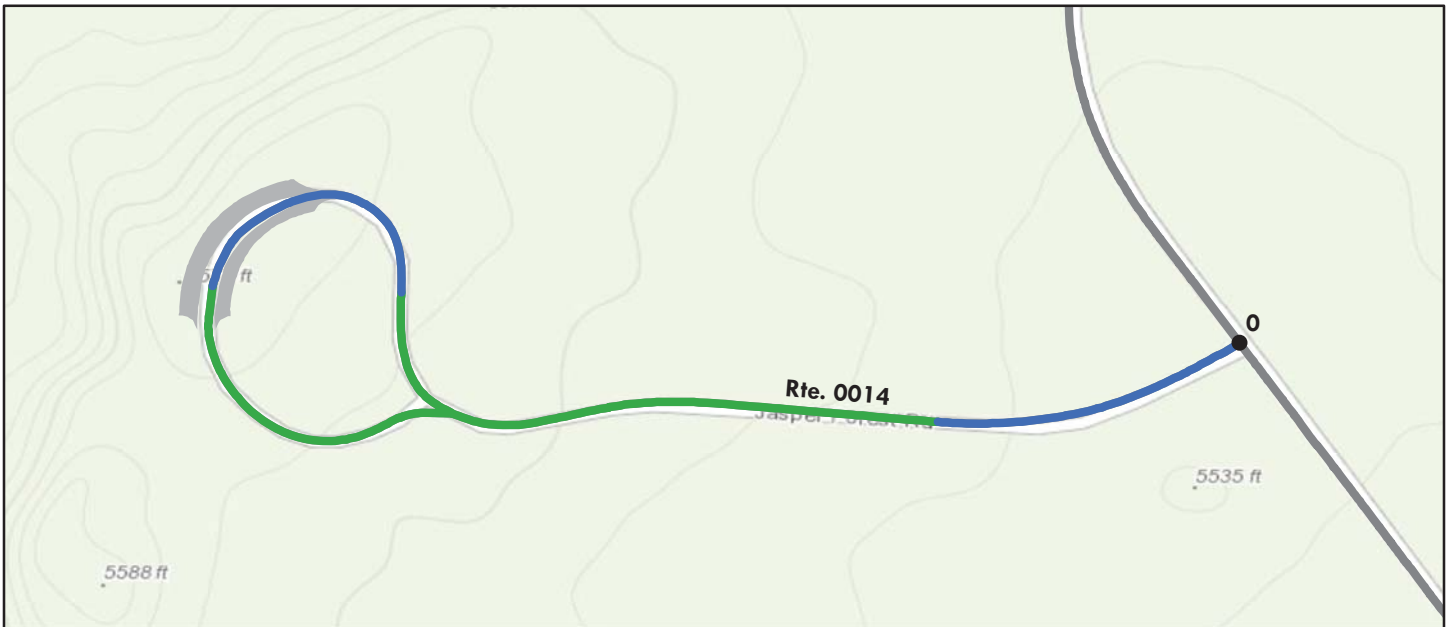
Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	0				
<b>Paved Length (Miles):</b> 0.25	<b>Section Length (MI)</b>	0.25				
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	93	93				
Surface Condition Rating (SCR)	93	93				
Roughness Condition Index (RCI)	N/A	N/A				
<b>Distress Index Values</b>						
Structural Crack Index	99	99				
Alligator Crack Index	100	100				
Longitudinal Crack Index	99	99				
Transverse Cracking Index	98	98				
Patching Index	100	100				
Rutting Index	93	93				
International Roughness Index (IRI)	N/A	N/A				
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2				
Paved Width (ft)	22.4	22.4				
Lane Width (ft)	9	9				



# Petrified Forest National Park

## ROUTE 0014: JASPER FOREST ROAD

### Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	0				
<b>Paved Length (Miles):</b> 0.51	<b>Section Length (MI)</b>	0.51				
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	88	88				
Surface Condition Rating (SCR)	98	98				
Roughness Condition Index (RCI)	74	74				
<b>Distress Index Values</b>						
Structural Crack Index	100	100				
Alligator Crack Index	100	100				
Longitudinal Crack Index	100	100				
Transverse Cracking Index	98	98				
Patching Index	100	100				
Rutting Index	98	98				
International Roughness Index (IRI)	189	189				
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2				
Paved Width (ft)	18.6	18.6				
Lane Width (ft)	9.7	9.7				

# Petrified Forest National Park

## ROUTE 0200: CHINDE POINT ACCESS ROAD

### Data Collection Vehicle (DCV) Rating



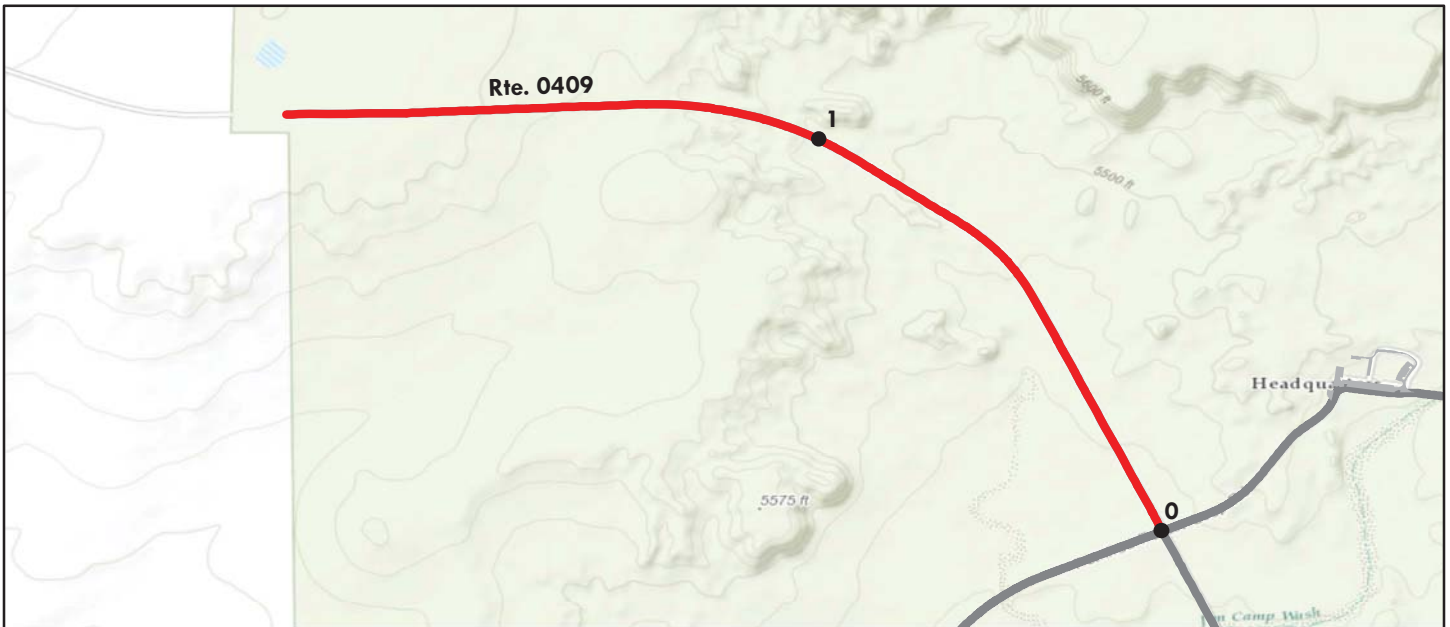
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	0				
<b>Paved Length (Miles):</b> 0.34	<b>Section Length (MI)</b>	0.34				
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	87	87				
Surface Condition Rating (SCR)	87	87				
Roughness Condition Index (RCI)	N/A	N/A				
<b>Distress Index Values</b>						
Structural Crack Index	99	99				
Alligator Crack Index	100	100				
Longitudinal Crack Index	99	99				
Transverse Cracking Index	87	87				
Patching Index	100	100				
Rutting Index	98	98				
International Roughness Index (IRI)	N/A	N/A				
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2				
Paved Width (ft)	22.3	22.3				
Lane Width (ft)	11.1	11.1				

# Petrified Forest National Park

## ROUTE 0409: OLD ROUTE 180 NORTH

### Data Collection Vehicle (DCV) Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/5/2017	<b>Beginning Section MP</b>	0	1			
<b>Paved Length (Miles):</b> 1.90	<b>Section Length (MI)</b>	1	0.90			
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	13	12	14			
Surface Condition Rating (SCR)	0	0	0			
Roughness Condition Index (RCI)	33	31	35			
<b>Distress Index Values</b>						
Structural Crack Index	0	0	0			
Alligator Crack Index	0	0	0			
Longitudinal Crack Index	0	0	5			
Transverse Cracking Index	11	15	7			
Patching Index	91	86	95			
Rutting Index	85	83	88			
International Roughness Index (IRI)	388	400	373			
<b>Lane &amp; Width Information</b>						
Number of Lanes	2	2	2			
Paved Width (ft)	19.5	19.8	19.3			
Lane Width (ft)	9.8	9.9	9.7			

# Petrified Forest National Park

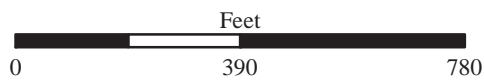
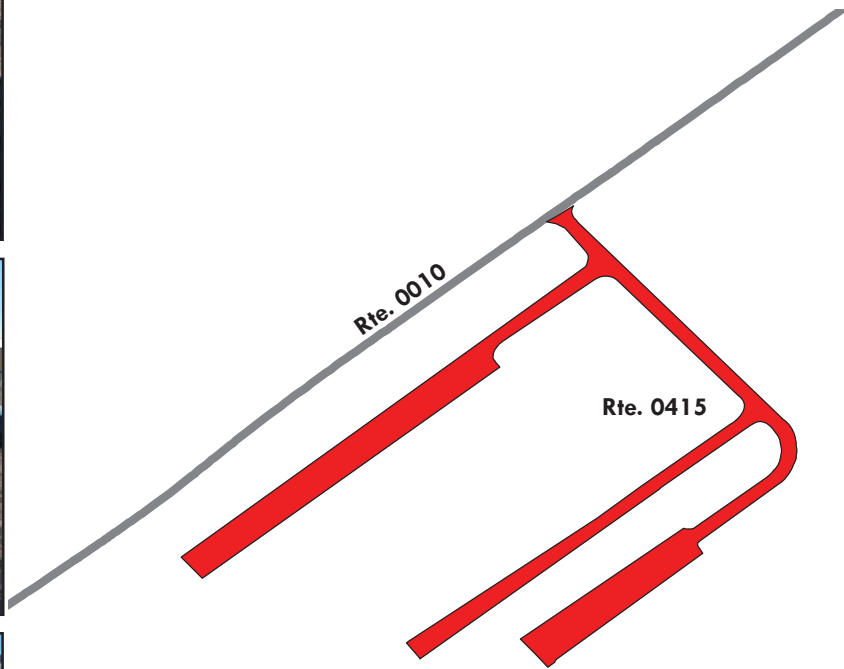
## ROUTE 0415: PD RESIDENCE AREA

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.64 (ON RIGHT)

THROUGH RESIDENCE AREA

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74063	NONPUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Pavement Recommendation	
81,730	1.407	HEAVY 3R TREATMENTS	
Condition Rating / PCR			
POOR / 53			
Route Condition Legend – Pavement Condition Rating (PCR)			
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)
Not Rated			
See Appendix for definitions and formulas			



# Petrified Forest National Park

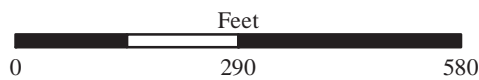
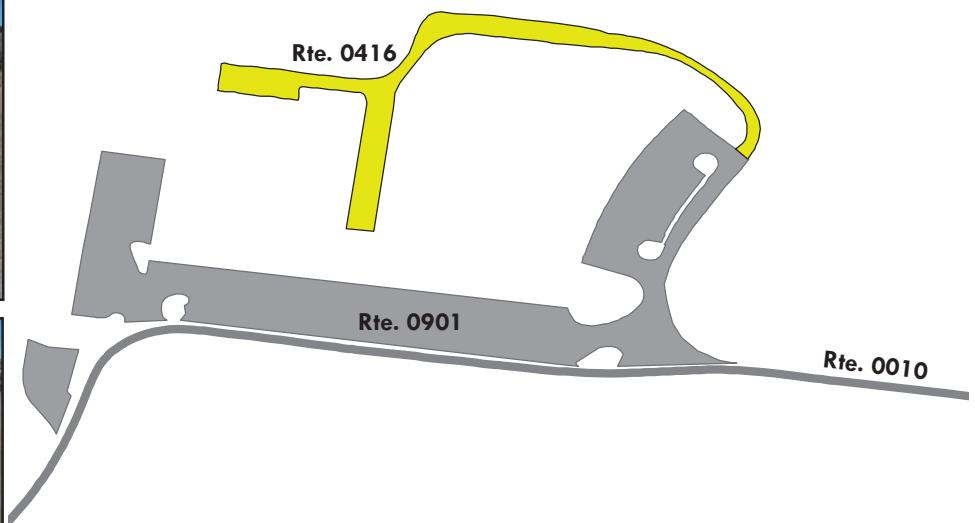
## ROUTE 0416: RF SOUTH RESIDENCE AREA

Manual Rating

FROM ROUTE 0901 (RF MUSEUM AND PICNIC PARKING)

TO END

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74070	NONPUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Pavement Recommendation	
19,650	0.338	LIGHT 3R TREATMENTS	
Condition Rating / PCR			
FAIR / 73			
Route Condition Legend – Pavement Condition Rating (PCR)			
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)
Not Rated			
See Appendix for definitions and formulas			



# Petrified Forest National Park

## ROUTE 0419: OLD ROUTE 180 EAST

Manual Rating



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Route Condition Legend – Pavement Condition Rating (PCR)						
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated		
See Appendix for definitions and formulas						
<b>Inspection Date:</b> 1/12/2016	<b>Beginning Section MP</b>	0.00				
<b>Paved Length (Miles):</b> 1.92	<b>Section Length (MI)</b>	1.92				
<b>Surface Type:</b> ASPHALT	<b>Route Summary</b>					
<b>Roadway Condition Information</b>						
Pavement Condition Rating (PCR)	0	0				
Surface Condition Rating (SCR)	0	0				
Roughness Condition Index (RCI)	N/A	N/A				
<b>Distress Index Values</b>						
Structural Crack Index	N/A	N/A				
Alligator Crack Index	N/A	N/A				
Longitudinal Crack Index	N/A	N/A				
Transverse Cracking Index	N/A	N/A				
Patching Index	N/A	N/A				
Rutting Index	N/A	N/A				
International Roughness Index (IRI)	N/A	N/A				
<b>Lane &amp; Width Information</b>						
Number of Lanes	1	1				
Paved Width (ft)	15	15				
Lane Width (ft)	15	15				

Route was given a Pavement Condition Rating (PCR) of 0 because it is in very poor condition. Individual distress indices could not be determined because of the poor condition and missing sections of pavement.

# Petrified Forest National Park

## ROUTE 0419: OLD ROUTE 180 EAST

### Condition Photos

Condition photos are shown only for manually rated roads. Use the PathView program to see images of DCV rated roads.



PEFO\_0419\_4022\_EXTRA.jpg



PEFO\_0419\_4025.jpg



PEFO\_0419\_4200.jpg



PEFO\_0419\_4203.jpg



PEFO\_0419\_4237.jpg



PEFO\_0419\_4335.jpg

# Section 6 Paved Parking Area Condition Rating Sheets



**Petrified Forest National Park**



**Federal Lands Highway  
Road Inventory Program**



# Petrified Forest National Park

## ROUTE 0900: PD VISITOR CENTER PARKING

Manual Rating

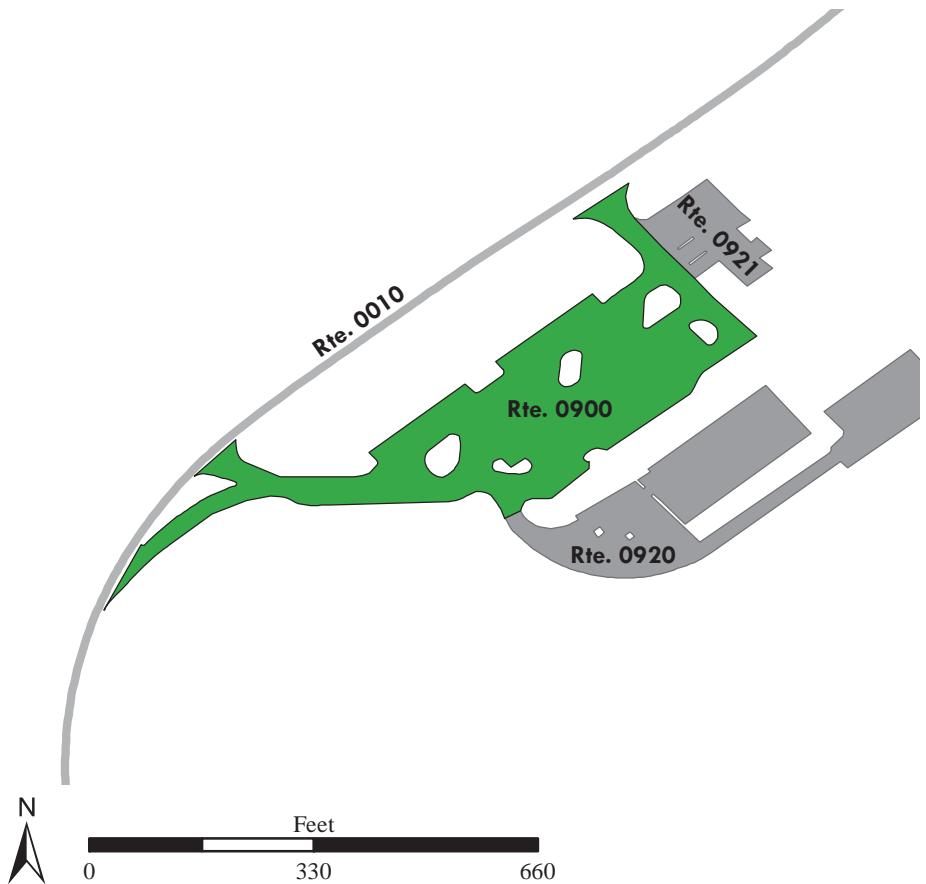
FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.28 ON RIGHT  
TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.44 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74073	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
90,188	1.553	5	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

**Route Condition Legend – Pavement Condition Rating (PCR)**

<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
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See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0901: RF MUSEUM AND PICNIC PARKING

Manual Rating

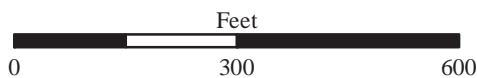
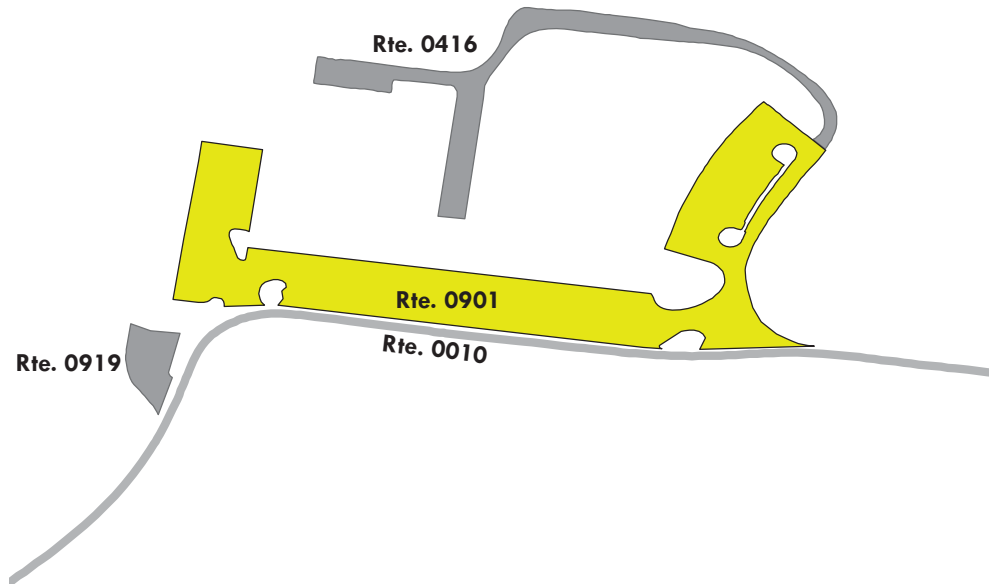
FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 26.17 ON RIGHT  
TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 26.27 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74076	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
73,641	1.268	6	DO NOTHING
Curb Type		Curb & Gutter Type	
STONE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

**Route Condition Legend – Pavement Condition Rating (PCR)**

<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
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See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0902: CRYSTAL FOREST PARKING

Manual Rating

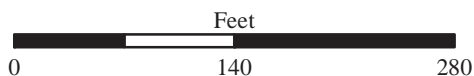
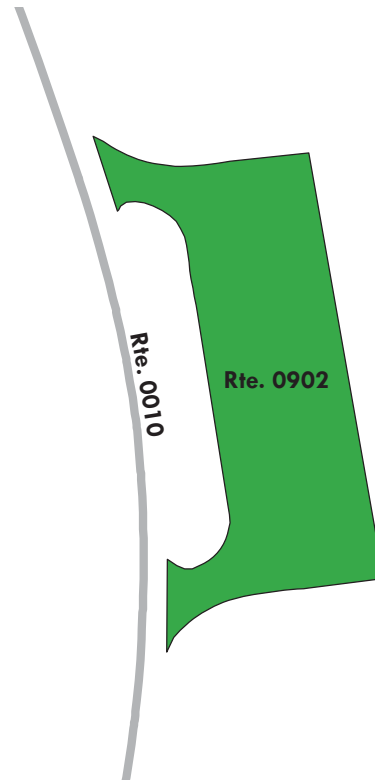
FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 20.41 ON LEFT

TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 20.47 ON LEFT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74080	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
22,519	0.388	6	DO NOTHING
Curb Type		Curb & Gutter Type	
STONE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

Route Condition Legend – Pavement Condition Rating (PCR)				
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated
See Appendix for definitions and formulas				



# Petrified Forest National Park

## ROUTE 0904: AGATE BRIDGE PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 17.97 ON LEFT

TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74086	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
23,965	0.413	6	DO NOTHING
Curb Type		Curb & Gutter Type	
STONE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

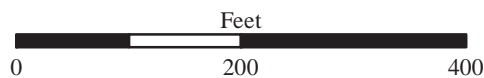
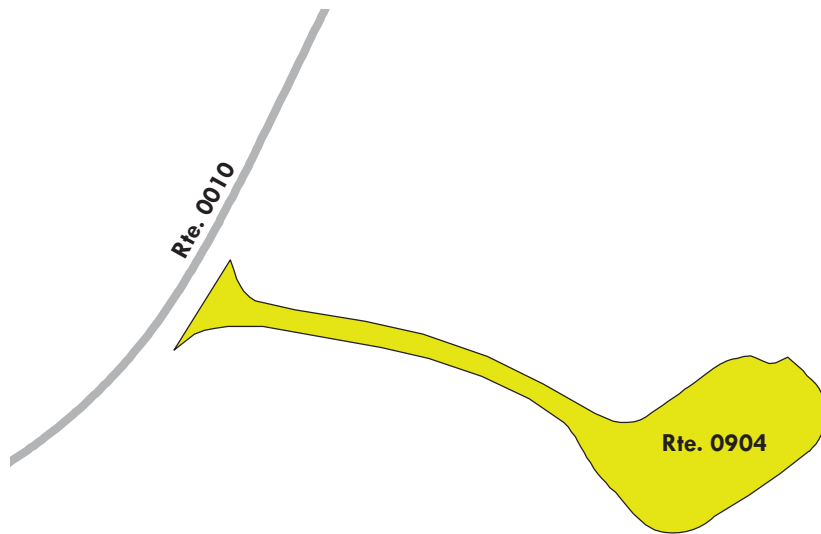
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0905: TIPONI POINT PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.98 ON RIGHT

TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 1.10 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74088	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
39,281	0.676	5	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

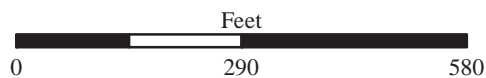
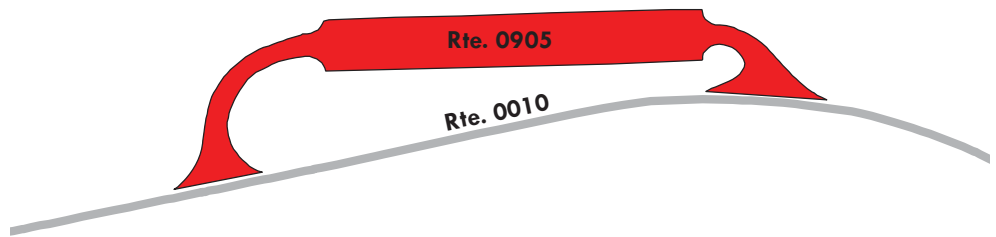
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0906: TAWA POINT PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 1.86 ON RIGHT

TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74092	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
30,360	0.523	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

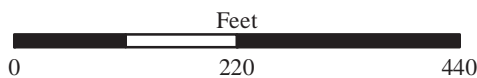
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0907: KACHINA POINT PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 2.20 ON RIGHT

TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 2.32 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74095	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
43,553	0.75	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

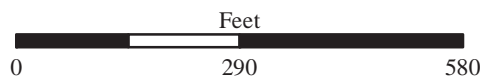
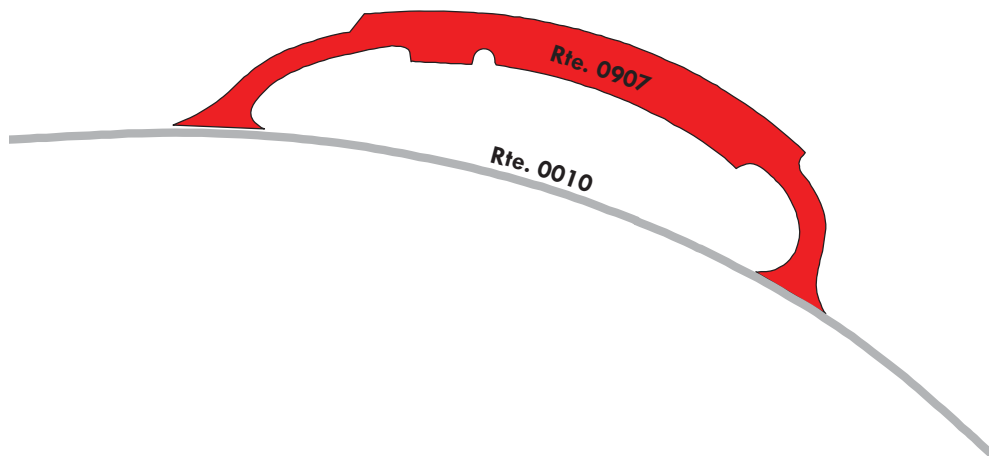
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0908: PINTADO POINT PARKING

Manual Rating

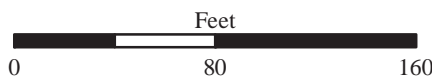
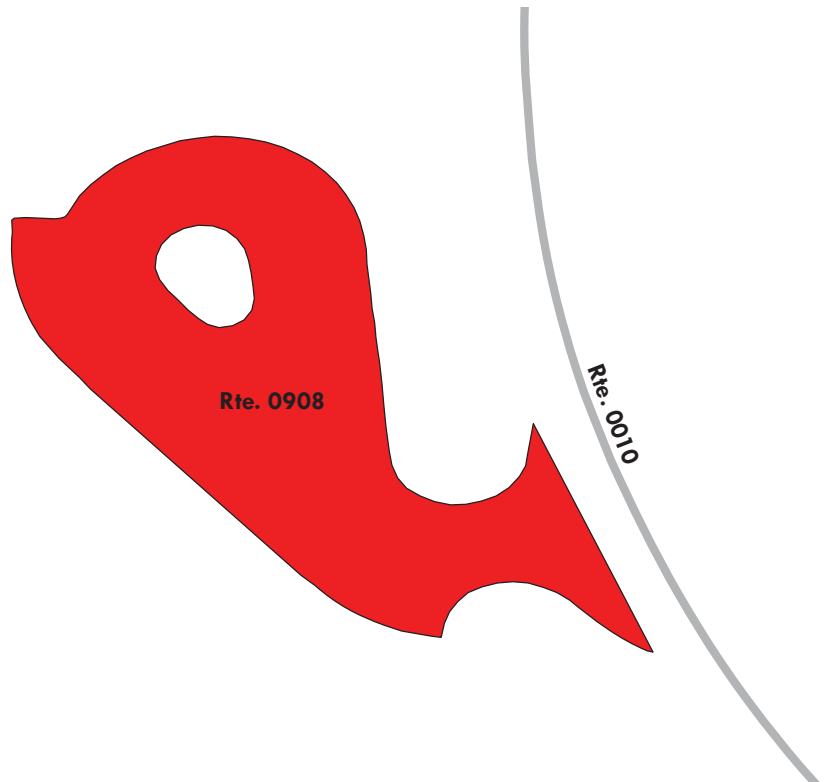
FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 3.06 ON RIGHT  
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74101	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
17,188	0.296	4	LIGHT REPAIR
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)	Not Rated
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See Appendix for definitions and formulas





# Petrified Forest National Park

## ROUTE 0909: NIZHONI POINT PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.22 ON RIGHT

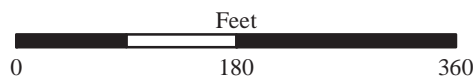
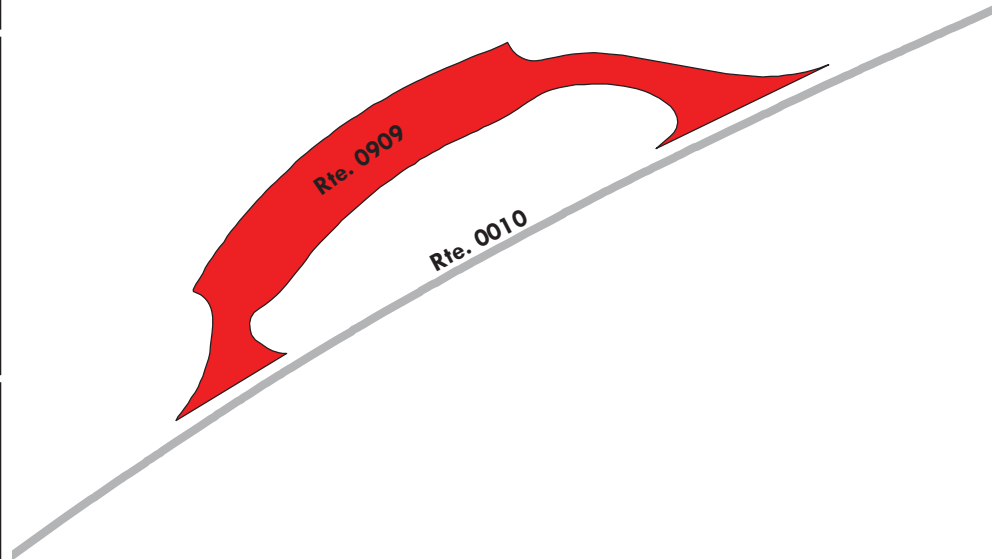
TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.30 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74103	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
22,823	0.393	NOT APPLICABLE	DO NOTHING
Curb Type		Curb & Gutter Type	
NO CURB		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)
Fair (61- 84)
Good (85 - 94)
Excellent (95 - 100)
Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0910: WHIPPLE POINT PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.43 ON RIGHT

TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.52 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74105	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
21,571	0.371	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

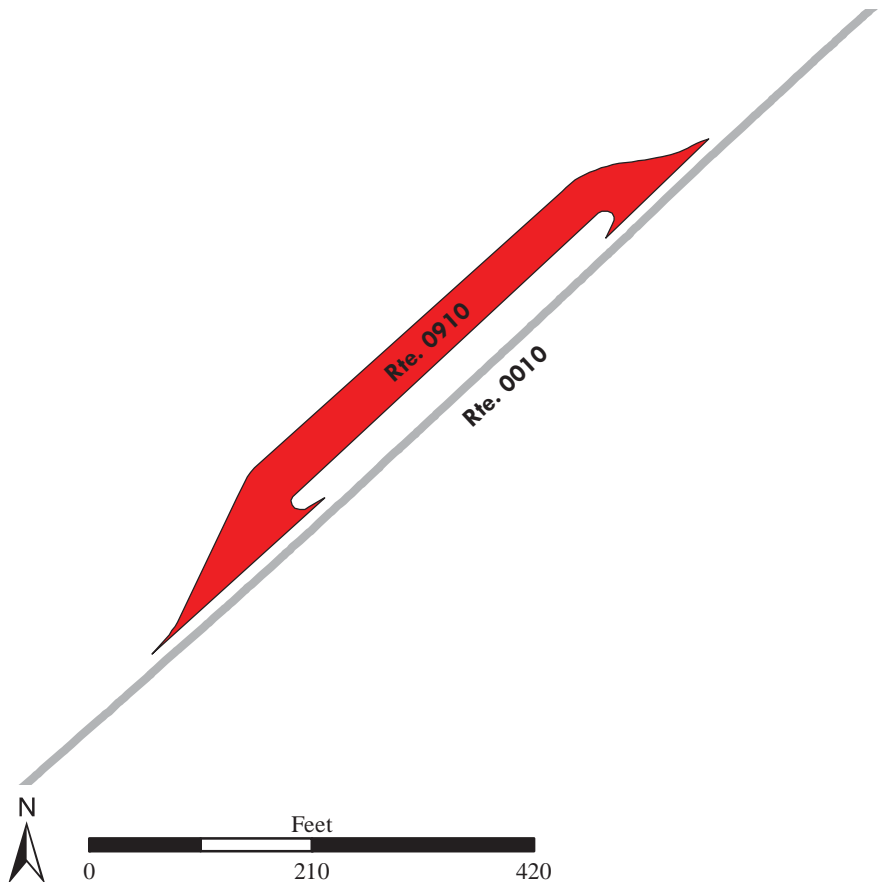
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0911: LACEY POINT PARKING

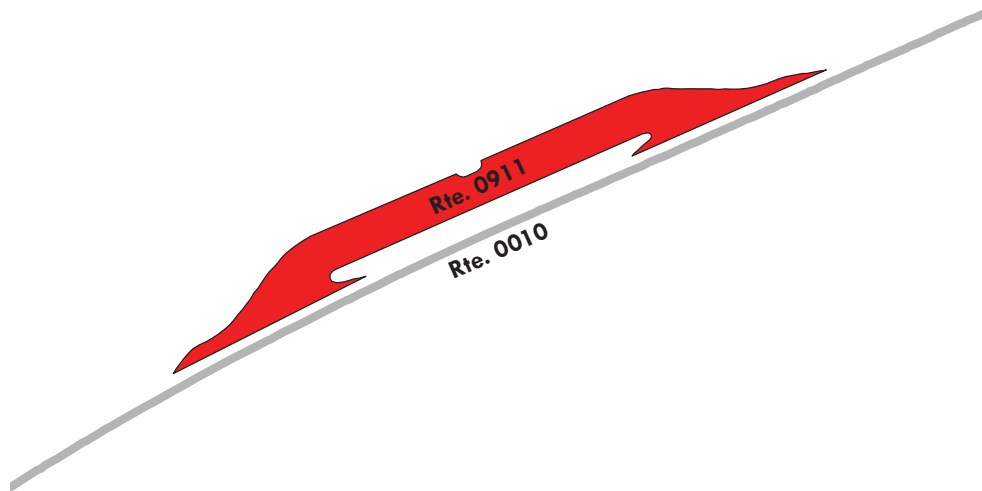
Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.84 ON RIGHT

TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 4.91 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74107	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
14,583	0.251	NOT APPLICABLE	DO NOTHING
Curb Type		Curb & Gutter Type	
NO CURB		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	
Route Condition Legend – Pavement Condition Rating (PCR)			
Poor (0 - 60)	Fair (61- 84)	Good (85 - 94)	Excellent (95 - 100)
Not Rated			
See Appendix for definitions and formulas			

No Condition Photos Available.



# Petrified Forest National Park

## ROUTE 0912: PUERCO PUEBLO PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 11.07 ON LEFT

TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 11.14 ON LEFT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74110	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
38,018	0.655	6	DO NOTHING
Curb Type		Curb & Gutter Type	
STONE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

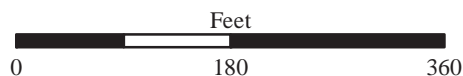
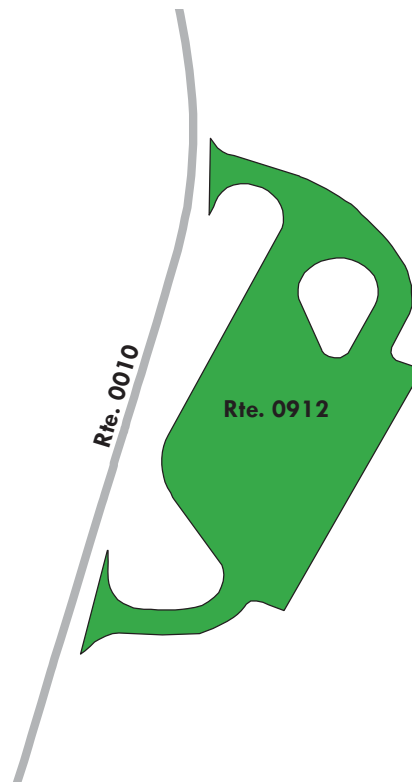
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0913: NORTH ENTRANCE PARKING

Manual Rating

FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.04 ON RIGHT

TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 0.06 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74113	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
25,330	0.436	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

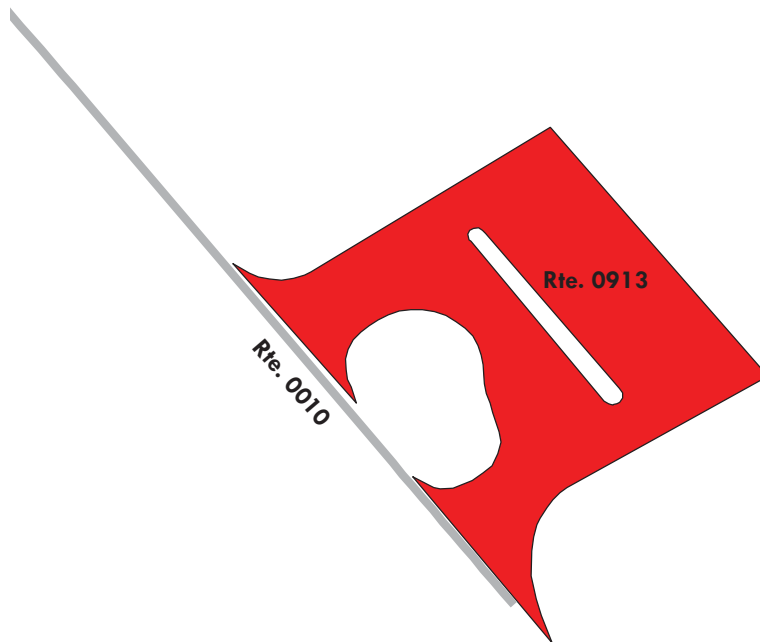
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0914: BLUE MESA LOOP TRAIL PARKING

Manual Rating

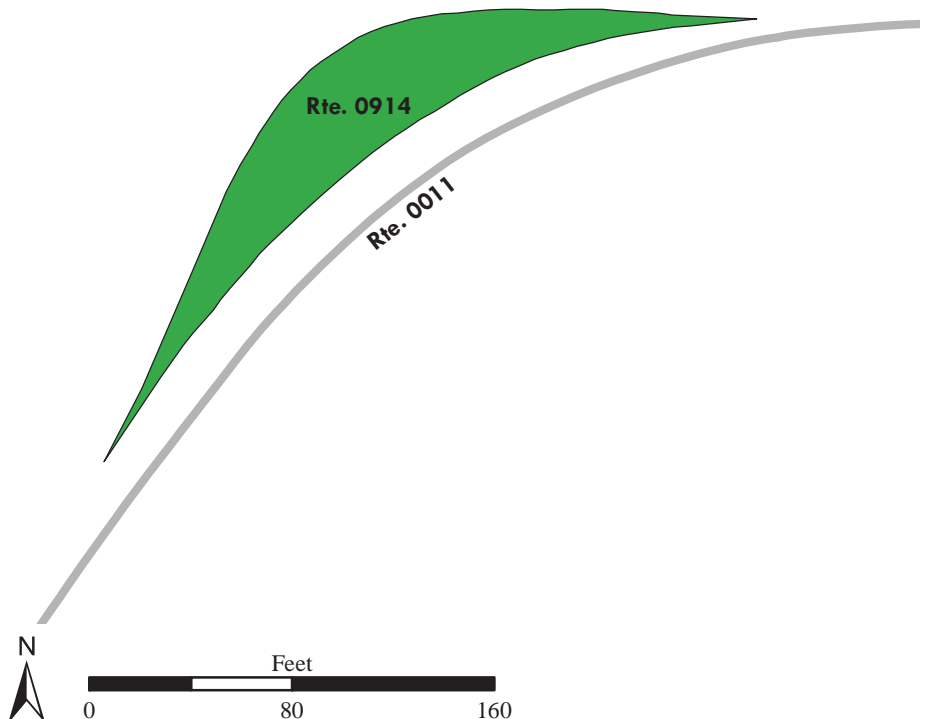
ADJACENT TO ROUTE 0011 (BLUE MESA ROAD) AT MP 2.71 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74120	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
5,395	0.093	4	DO NOTHING
Curb Type		Curb & Gutter Type	
ASPHALT		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

**Route Condition Legend – Pavement Condition Rating (PCR)**

<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
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See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0915: NO NAME OVERLOOK PARKING

Manual Rating

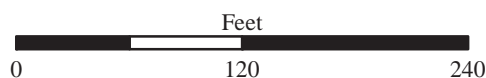
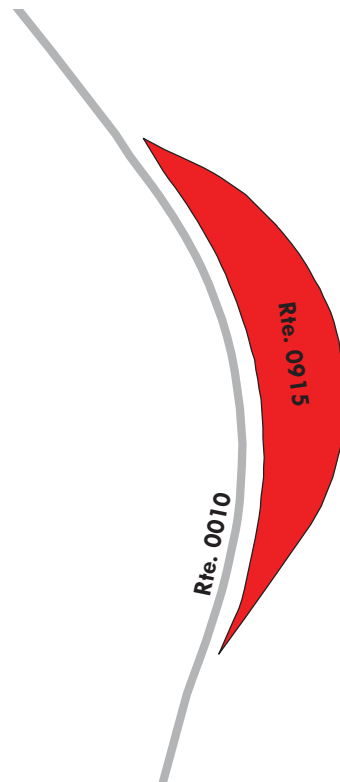
ADJACENT TO ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 1.70 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74130	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
7,247	0.125	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

**Route Condition Legend – Pavement Condition Rating (PCR)**

<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
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See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0916: NEWSPAPER ROCK PARKING

Manual Rating

FROM END OF ROUTE 0012 (NEWSPAPER ROCK ROAD)

TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74132	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
24,577	0.423	6	DO NOTHING
Curb Type		Curb & Gutter Type	
STONE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

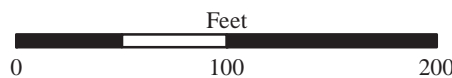
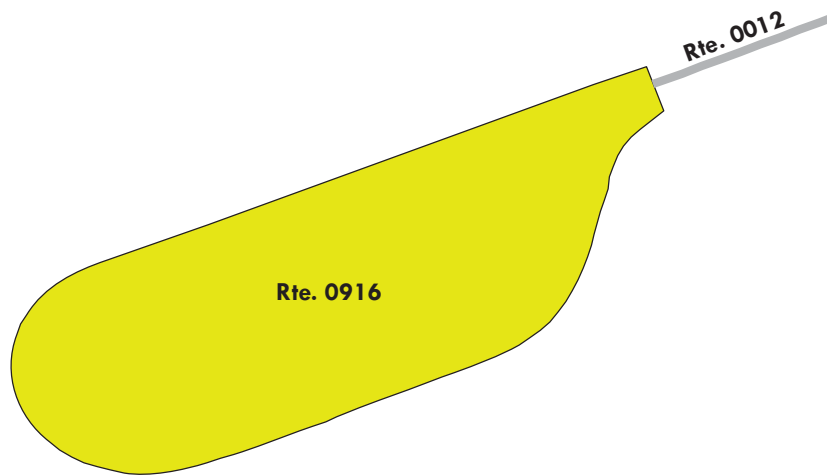
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas





# Petrified Forest National Park

## ROUTE 0917ZZ: JASPER FOREST PARKING AREAS

Summary Route  
Manual Rating

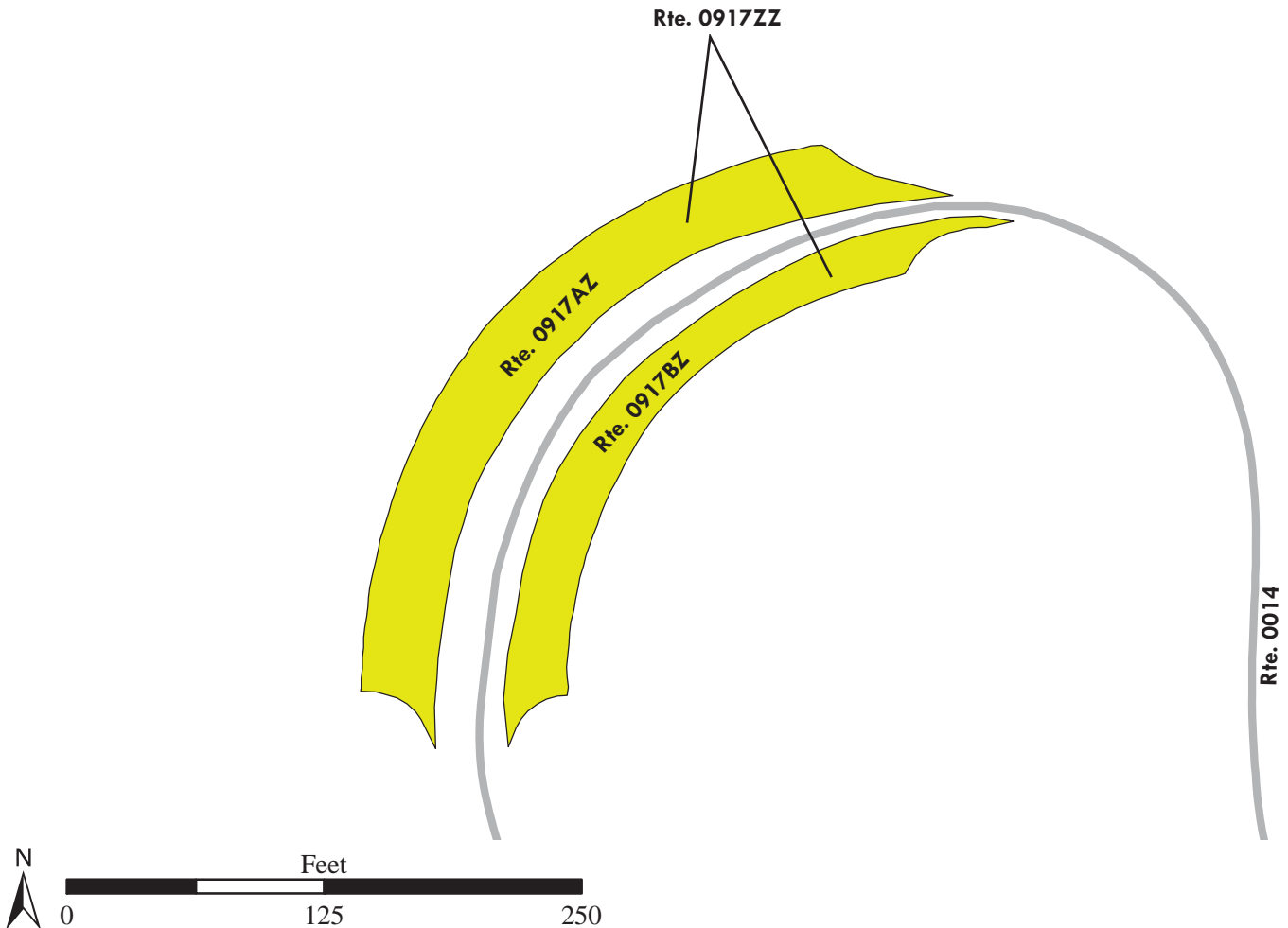
ADJACENT TO ROUTE 0014 (JASPER FOREST ROAD) AT MP 0.38 ON RIGHT AND LEFT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74133	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Condition Rating / PCR	
17,812	0.307	SUMMARY / 73	

Route Condition Legend – Pavement Condition Rating (PCR)				
<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
See Appendix for definitions and formulas				

The condition shown on this page reflects the overall route condition and may not reflect individual subcomponent ratings.



# Petrified Forest National Park

## ROUTE 0917AZ: JASPER FOREST PARKING AREA A

Subcomponent of Route PEFO-0917ZZ  
Manual Rating

ADJACENT TO ROUTE 0014 (JASPER FOREST ROAD) AT MP 0.39 ON RIGHT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74133	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
11,199	0.193	NOT APPLICABLE	DO NOTHING
Curb Type		Curb & Gutter Type	
NO CURB		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

**Route Condition Legend – Pavement Condition Rating (PCR)**

<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
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See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0917BZ: JASPER FOREST PARKING AREA B

Subcomponent of Route PEFO-0917ZZ  
Manual Rating

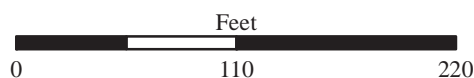
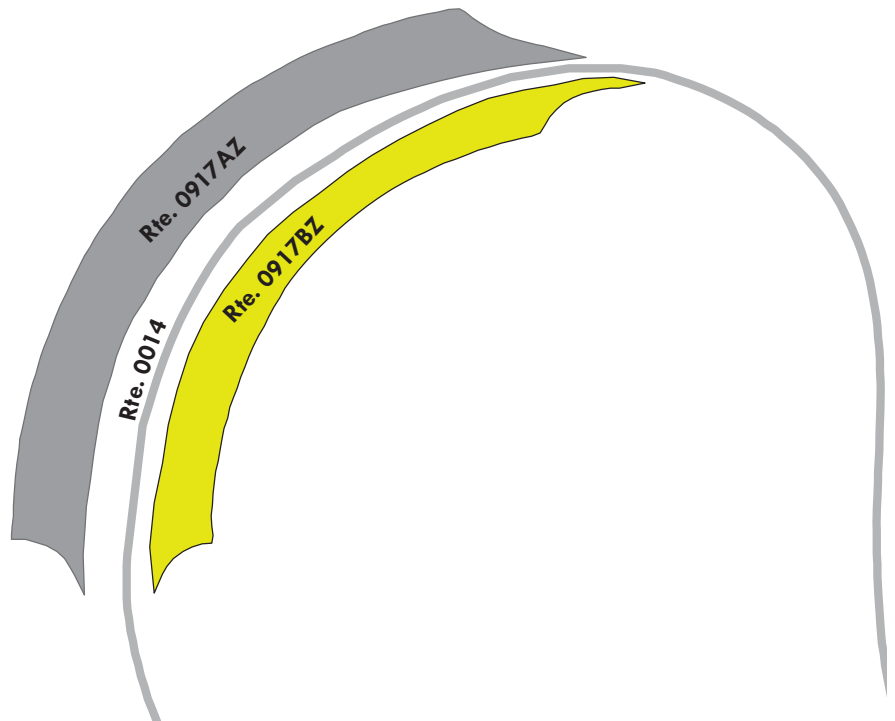
ADJACENT TO ROUTE 0014 (JASPER FOREST ROAD) AT MP 0.38 ON LEFT

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74133	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
6,613	0.114	NOT APPLICABLE	DO NOTHING
Curb Type		Curb & Gutter Type	
NO CURB		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

**Route Condition Legend – Pavement Condition Rating (PCR)**

<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
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See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0919: SOUTH AREA RANGER PARKING

Manual Rating

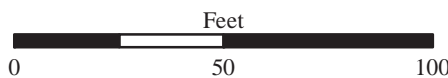
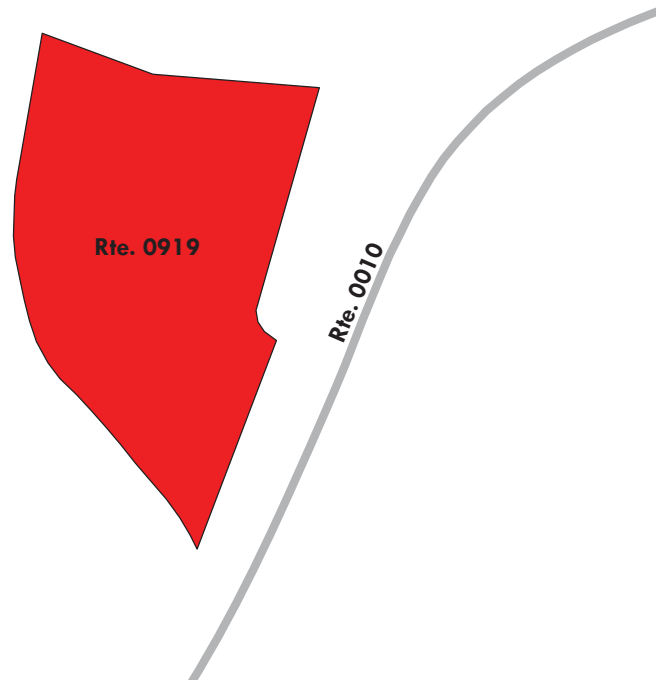
FROM ROUTE 0010 (NORTH-SOUTH HIGHWAY) AT MP 26.30 ON RIGHT  
TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	74136	NONPUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
4,506	0.078	NOT APPLICABLE	NOT APPLICABLE
Curb Type		Curb & Gutter Type	
NO CURB		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
HEAVY 3R TREATMENTS		POOR / 53	

**Route Condition Legend – Pavement Condition Rating (PCR)**

<b>Poor (0 - 60)</b>	<b>Fair (61- 84)</b>	<b>Good (85 - 94)</b>	<b>Excellent (95 - 100)</b>	<b>Not Rated</b>
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See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0920: PD MAINTENANCE AND ADMINISTRATION AREA PARKING

Manual Rating

FROM ROUTE 0900 (PD VISITOR CENTER PARKING)

TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	90618	NONPUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
53,408	0.92	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		CONCRETE	
Pavement Recommendation		Condition Rating / PCR	
PREVENTIVE MAINTENANCE		GOOD / 90	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

Fair (61- 84)

Good (85 - 94)

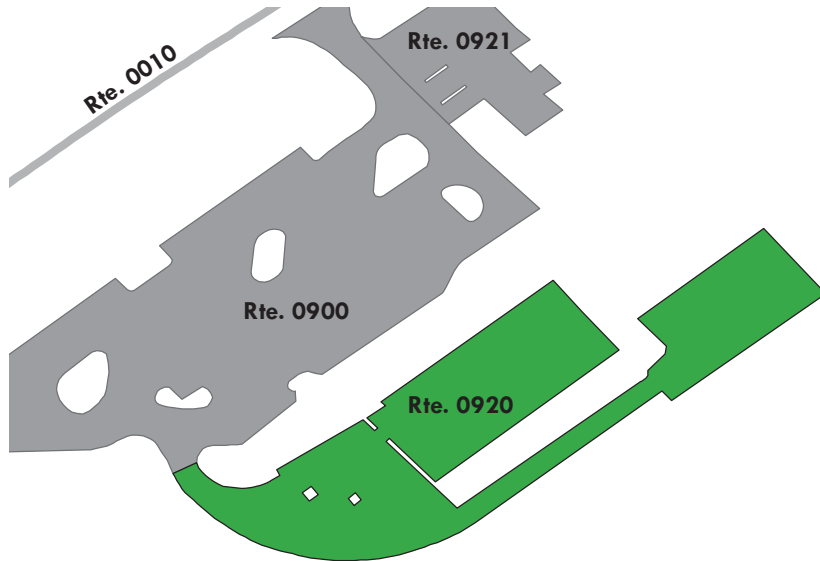
Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



Note: Parking area consists of multiple surface types: 2 parts Asphalt at 42,777 square feet; 3 parts Concrete at 10,631 square feet.



# Petrified Forest National Park

## ROUTE 0921: PDC GAS STATION PARKING

Manual Rating

FROM ROUTE 0900 (PD VISITOR CENTER PARKING)

TO GAS STATION

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	232465	PUBLIC	ASPHALT
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
12,625	0.217	NOT APPLICABLE	NOT APPLICABLE
Curb Type		Curb & Gutter Type	
NO CURB		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

Fair (61- 84)

Good (85 - 94)

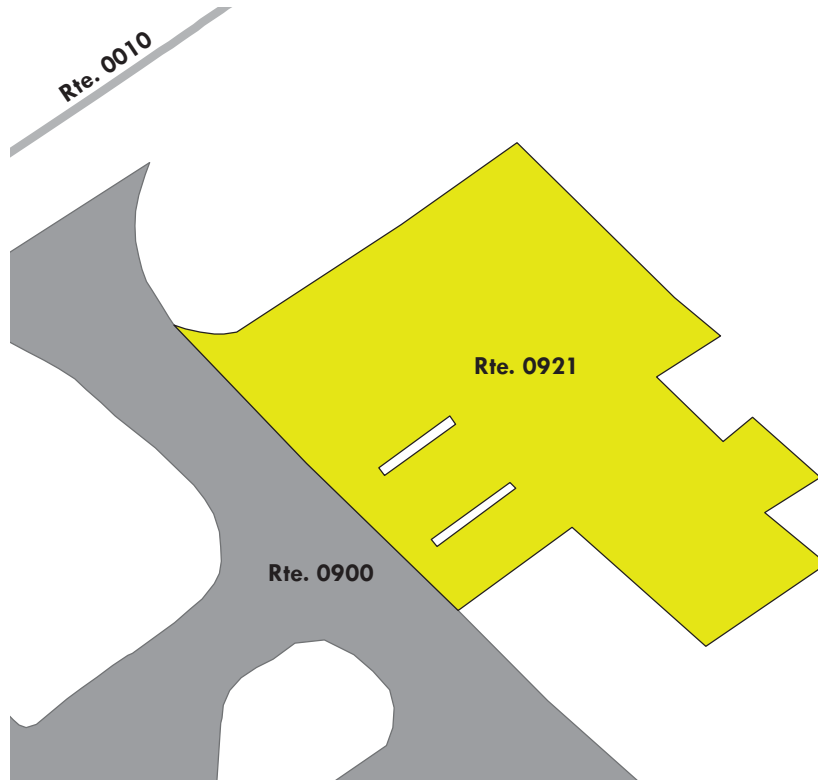
Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



Note: Parking area consists of multiple surface types: 1 part Asphalt at 7,723 square feet; 2 parts Concrete at 4,902 square feet.



# Petrified Forest National Park

## ROUTE 0923: HH PARKING 1

Manual Rating

FROM HELLICKSON DRIVE (NON NPS)

TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	237649	NONPUBLIC	CONCRETE
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
5,367	0.092	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

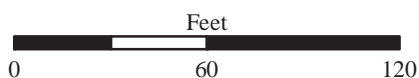
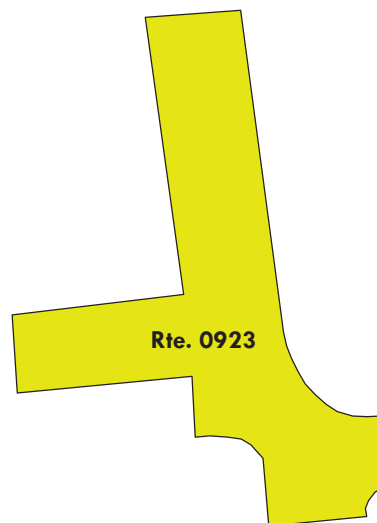
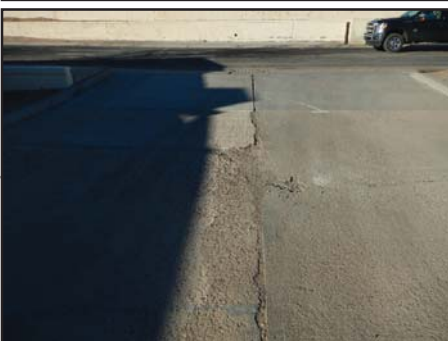
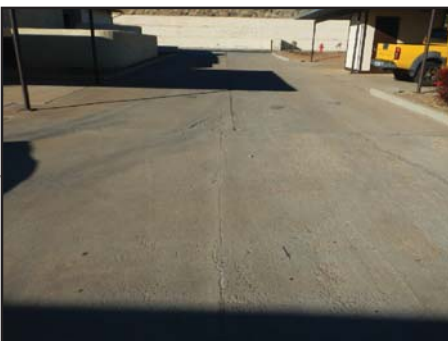
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas



# Petrified Forest National Park

## ROUTE 0924: HH PARKING 2

Manual Rating

FROM MORRIS LANE (NON NPS)

TO PARKING

Inspection Date	FMSS Number	User Access	Surface Type
1/12/2016	237651	NONPUBLIC	CONCRETE
Area (Sq. Ft.)	Lane Miles (11' Widths)	Curb Reveal (Inches)	Curb Recommendation
4,070	0.07	6	DO NOTHING
Curb Type		Curb & Gutter Type	
CONCRETE		NO CURB AND GUTTER	
Pavement Recommendation		Condition Rating / PCR	
LIGHT 3R TREATMENTS		FAIR / 73	

### Route Condition Legend – Pavement Condition Rating (PCR)

Poor (0 - 60)

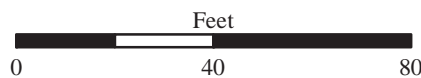
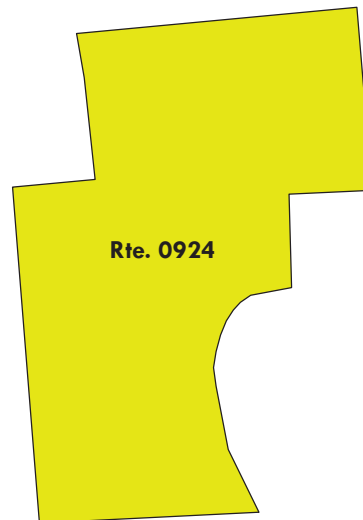
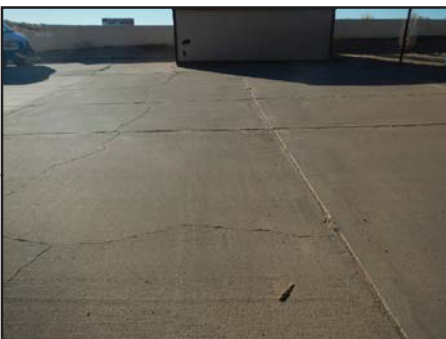
Fair (61- 84)

Good (85 - 94)

Excellent (95 - 100)

Not Rated

See Appendix for definitions and formulas





# Section 7 Road Milepost Information



**Petrified Forest National Park**



**Federal Lands Highway  
Road Inventory Program**

## Road Milepost Information

This report section contains road milepost information for all paved roads in the park that were collected with the Data Collection Vehicle (DCV). The milepost data is obtained from the DCV by using a distance measuring instrument (DMI) that is calibrated to record mileage to the nearest thousandth of a mile. Park roads that were manually rated did not have milepost data collected, and thus are not included in this report section.

For Cycle 6, the information presented in this section differs from previous RIP cycles in that it does not contain the roadside features inventories for the paved park roads. Some examples of the features previously collected are signs, culverts/drop inlets, guardrails, curbing, pullouts, etc. If the park was collected in a previous RIP cycle, then the latest features data can be obtained by referencing the following:

### Where to find the latest Features Inventories for NPS Parks:

- For Small Parks (parks with less than 10 miles of paved roads):
  - Refer to Cycle 5 data (collected 2010 - 2014)
    - Features were reported in Section 9 of the *Cycle 5* RIP report
    - Video of features can be viewed using the *PathViewVO* program and *Cycle 5* data
- For Large Parks (parks with more than 10 miles of paved roads):
  - Refer to Cycle 4 data (collected 2006 - 2009)
    - Features were reported in Section 9 of the *Cycle 4* RIP report
    - Video of features can be viewed using the *VisiData* program and *Cycle 4* data
  - Note: Features inventories were updated in Large Parks in *Cycle 5* only on a route by route basis if the route was new or modified in *Cycle 5*. If this is the case for a particular route, then features for the route can be obtained using the *PathViewVO* program and *Cycle 5* data (same as above for Small parks).

### Milepost Events Verified in Cycle 6

In Cycle 6, the following events were collected and reported in Section 7 of this report:

- Intersections with roads and parking areas
- All bridges and culverts with BIP Numbers (bridge inspection program numbers)
- Mile Marker Signs
- One-Way travel directions
- Overpasses
- Tunnels
- Low Water Crossings (LWCR)
- Surface type changes
- Construction areas where no pavement condition data was obtained

## **GPS Mileage Matching**

A consistent survey milepost and constant route length as recorded by the Data Collection Vehicle (DCV) is a challenge to maintain from one collection cycle to the next. The challenge is due to many factors such as driver characteristics, DMI calibration, tire pressure etc. After Cycle 4 (~2010), a decision was made to hold constant the length of roads so long as there was no physical change from reconstruction projects or realignments that would result in a change to the length of a road. Consequently, the “GPS Mileage Match” was implemented to specify which cycle the route length is being matched. Route mileages and GPS are matched to a previous collection whenever there is no physical change to a route alignment. The route mileage and GPS is not matched to previous cycles whenever it is determined that a road length and GPS needs to be updated. When this happens the GPS and length is updated to the cycle that displays the change, and that collection cycle is used as the matching cycle in subsequent collections of the road. Thus, the Cycle 6 GIS could be either the survey length collected in Cycle 4, Cycle 5, or Cycle 6 and therefore, may not match the survey milepost displayed in the latest Cycle 6 DCV video which is viewable in *PathView VO*.

The features inventories and road logs collected on NPS routes contain mileposts that are determined from the corresponding cycle that the GPS is matched to. Therefore, the mileposts contained in the Cycle 4 or 5 features inventories or the Cycle 6 road logs may not exactly match the survey milepost collected in the latest Cycle 6 video of the road.

## **Locating Mile Marker Signs**

For routes that have mile marker signs along them, the milepost reported by RIP will most likely not line up exactly with the sign located in the field. This could be happening for many reasons, most likely due to either the error falling within the acceptable calibration range of the vehicle, or the level of accuracy that the mile marker signs were placed in the field.

Because mile marker signs are important features in many project plans and location descriptions, RIP is reporting locations of mile marker signs in three ways in Cycle 6:

1. Mileposts from Cycle 6 GIS: the official RIP milepost taken from the features inventories and the matching GPS/mileage cycle as described above. This is the milepost that should be used on project plans and when finding locations in the field
2. Mileposts from Cycle 6 Video: milepost shown to help locate the mile marker sign in the latest *PathView VO* video.
3. Latitude / Longitude: a constant way of locating a mile marker sign so long as the park has not moved the sign

The mileposts from Cycle 6 Video and GIS should be nearly the same, but on longer roads it has been observed that the Video milepost deviates more from the official GIS milepost that comes from the matching cycle.

# PEFO: Route Milepost Log

## ROUTE 0010: NORTH-SOUTH HIGHWAY

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.00	0.00	INTERSECTION	L	PAVED ROUTE (I-40 WESTBOUND ENTRANCE RAMP)
0.00	0.00	INTERSECTION	R	PAVED ROUTE (I-40 WESTBOUND OFF RAMP)
0.00	0.00	INTERSECTION	N/A	PAVED ROUTE (I-40 BRIDGE)
0.04	0.04	INTERSECTION	R	ROUTE 0913 (NORTH ENTRANCE PARKING)
0.06	0.06	INTERSECTION	R	ROUTE 0913 (NORTH ENTRANCE PARKING)
0.12	0.12	MILE MARKER	R	MILE MARKER 0
0.28	0.28	INTERSECTION	R	ROUTE 0900 (PD VISITOR CENTER PARKING)
0.33	0.33	INTERSECTION	R	ROUTE 0900 (PD VISITOR CENTER PARKING)
0.44	0.44	INTERSECTION	R	ROUTE 0900 (PD VISITOR CENTER PARKING)
0.64	0.64	INTERSECTION	R	ROUTE 0415 (PD RESIDENCE AREA)
0.89	0.89	INTERSECTION	R	ROUTE 0400 (OLD ROUTE 66)
0.98	0.98	INTERSECTION	R	ROUTE 0905 (TIPONI POINT PARKING)
1.10	1.10	INTERSECTION	R	ROUTE 0905 (TIPONI POINT PARKING)
1.12	1.12	INTERSECTION	R	MILE MARKER 1
1.70	1.70	INTERSECTION	R	ROUTE 0915 (NO NAME OVERLOOK PARKING)
1.86	1.86	INTERSECTION	R	ROUTE 0906 (TAWA POINT PARKING)
2.12	2.12	INTERSECTION	R	MILE MARKER 2
2.20	2.20	INTERSECTION	R	ROUTE 0907 (KACHINA POINT PARKING)
2.22	2.22	INTERSECTION	L	UNPAVED ROUTE
2.32	2.32	INTERSECTION	R	ROUTE 0907 (KACHINA POINT PARKING)
2.46	2.46	INTERSECTION	R	ROUTE 0200 (CHINDE POINT ACCESS ROAD)
3.06	3.06	INTERSECTION	R	ROUTE 0908 (PINTADO POINT PARKING)
3.12	3.12	INTERSECTION	R	MILE MARKER 3
3.20	3.20	INTERSECTION	L	UNPAVED ROUTE
3.98	3.98	INTERSECTION	L	UNPAVED ROUTE
4.12	4.12	INTERSECTION	R	MILE MARKER 4
4.22	4.22	INTERSECTION	R	ROUTE 0909 (NIZHONI POINT PARKING)
4.30	4.30	INTERSECTION	R	ROUTE 0909 (NIZHONI POINT PARKING)
4.43	4.43	INTERSECTION	R	ROUTE 0910 (WHIPPLE POINT PARKING)

# PEFO: Route Milepost Log

## ROUTE 0010: NORTH-SOUTH HIGHWAY

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
4.52	4.52	INTERSECTION	R	ROUTE 0910 (WHIPPLE POINT PARKING)
4.84	4.84	INTERSECTION	R	ROUTE 0911 (LACEY POINT PARKING)
4.91	4.91	INTERSECTION	R	ROUTE 0911 (LACEY POINT PARKING)
5.12	5.12	MILE MARKER	R	MILE MARKER 5
5.60	5.60	INTERSECTION	R	UNPAVED ROUTE
5.80	5.80	INTERSECTION	R	PAVED PARKING (HISTORIC ROUTE 66 INFORMATION/ NON NPS PARKING)
6.05	6.10	BRIDGE	N/A	A BIP STRUCTURE NUMBER HAS NOT BEEN ASSIGNED TO THIS BRIDGE
6.11	6.11	MILE MARKER	R	MILE MARKER 6
6.64	6.64	INTERSECTION	L	UNPAVED ROUTE
6.69	6.69	INTERSECTION	L	UNPAVED PARKING
7.11	7.11	MILE MARKER	R	MILE MARKER 7
8.11	8.11	MILE MARKER	R	MILE MARKER 8
8.17	8.17	INTERSECTION	L	UNPAVED ROUTE
9.11	9.11	MILE MARKER	R	MILE MARKER 9
10.11	10.11	MILE MARKER	R	MILE MARKER 10
10.52	10.55	BRIDGE	N/A	8430-003 (SANTA FE RAILROAD OVERPASS)
10.76	10.76	INTERSECTION	R	UNPAVED ROUTE (RAILROAD ACCESS)
10.92	11.01	BRIDGE	N/A	8430-002 (PUERCO RIVER BRIDGE)
11.04	11.04	INTERSECTION	R	UNPAVED ROUTE
11.07	11.07	INTERSECTION	L	ROUTE 0912 (PUERCO PUEBLO PARKING)
11.14	11.14	MILE MARKER	R	MILE MARKER 11
11.14	11.14	INTERSECTION	L	ROUTE 0912 (PUERCO PUEBLO PARKING)
12.05	12.05	INTERSECTION	R	ROUTE 0012 (NEWSPAPER ROCK ROAD)
12.11	12.11	MILE MARKER	R	MILE MARKER 12
13.11	13.11	MILE MARKER	R	MILE MARKER 13
14.13	14.13	MILE MARKER	R	MILE MARKER 14
15.12	15.12	MILE MARKER	R	MILE MARKER 15
15.66	15.66	INTERSECTION	R	UNPAVED ROUTE

# PEFO: Route Milepost Log

## ROUTE 0010: NORTH-SOUTH HIGHWAY

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
15.81	15.81	INTERSECTION	L	ROUTE 0011 (BLUE MESA ROAD)
15.96	15.98	BRIDGE	N/A	8430-009 (EAST FORK DRY WASH BRIDGE)
16.12	16.12	MILE MARKER	N/A	MILE MARKER 16 (LOCATION NOT VERIFIED IN VIDEO)
16.13	16.13	INTERSECTION	L	UNPAVED ROUTE
16.54	16.56	BRIDGE	N/A	8430-008 (DRY WASH BRIDGE)
16.70	16.70	INTERSECTION	R	UNPAVED ROUTE
17.12	17.12	MILE MARKER	R	MILE MARKER 17
17.97	17.97	INTERSECTION	L	ROUTE 0904 (AGATE BRIDGE PARKING)
17.98	17.98	INTERSECTION	R	UNPAVED ROUTE
18.12	18.12	MILE MARKER	R	MILE MARKER 18
18.67	18.67	INTERSECTION	R	ROUTE 0014 (JASPER FOREST ROAD)
19.17	19.17	INTERSECTION	R	ROUTE 0406 (SOUTH PIPELINE ROAD)
19.18	19.18	MILE MARKER	R	MILE MARKER 19
19.44	19.45	BRIDGE	N/A	8430-007 (CRYSTAL FOREST BRIDGE)
20.12	20.12	MILE MARKER	R	MILE MARKER 20
20.41	20.41	INTERSECTION	L	ROUTE 0902 (CRYSTAL FOREST PARKING)
20.47	20.47	INTERSECTION	L	ROUTE 0902 (CRYSTAL FOREST PARKING)
21.13	21.13	MILE MARKER	R	MILE MARKER 21
22.13	22.13	MILE MARKER	R	MILE MARKER 22
22.33	22.34	BRIDGE	N/A	8430-006 (FLATTOPS BRIDGE)
23.13	23.13	MILE MARKER	R	MILE MARKER 23
23.13	23.13	MILE MARKER	R	MILE MARKER 24
25.13	25.13	MILE MARKER	R	MILE MARKER 25
26.10	26.13	BRIDGE	N/A	8430-005 (JIM CAMP WASH BRIDGE)
26.17	26.17	INTERSECTION	R	ROUTE 0901 (RF MUSEUM AND PICNIC PARKING)
26.17	26.17	MILE MARKER	R	MILE MARKER 26
26.22	26.22	INTERSECTION	R	ROUTE 0901 (RF MUSEUM AND PICNIC PARKING)
26.27	26.27	INTERSECTION	R	ROUTE 0901 (RF MUSEUM AND PICNIC PARKING)
26.30	26.30	INTERSECTION	R	ROUTE 0919 (SOUTH AREA RANGER PARKING)

Data Collected on 1/2017

# PEFO: Route Milepost Log

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## ROUTE 0010: NORTH-SOUTH HIGHWAY

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

<b>FROM MILEPOST</b>	<b>TO MILEPOST</b>	<b>FEATURE</b>	<b>SIDE</b>	<b>COMMENT</b>
26.70	26.70	INTERSECTION	R	ROUTE 0409 (OLD ROUTE 180 NORTH)
26.70	26.70	INTERSECTION	L	ROUTE 0419 (OLD ROUTE 180 EAST)
26.98	27.00	BRIDGE	N/A	8430-001 (COTTONWOOD WASH BRIDGE)
27.11	27.11	MILE MARKER	R	MILE MARKER 27
28.10	28.10	MILE MARKER	R	MILE MARKER 28
28.48	28.48	INTERSECTION	N/A	PAVED ROUTE (PETRIFIED FOREST ROAD)
28.48	28.48	PARK BOUNDARY	N/A	SOUTH PARK BOUNDARY

# PEFO: Route Milepost Log

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## ROUTE 0011: BLUE MESA ROAD

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

<b>FROM MILEPOST</b>	<b>TO MILEPOST</b>	<b>FEATURE</b>	<b>SIDE</b>	<b>COMMENT</b>
0.00	0.00	INTERSECTION	R	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.00	0.00	INTERSECTION	L	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
1.34	1.34	INTERSECTION	R	UNPAVED ROUTE
1.75	1.75	ONE-WAY START	N/A	N/A
1.75	1.75	INTERSECTION	L	ROUTE 0011 (BLUE MESA ROAD)
2.71	2.71	INTERSECTION	R	ROUTE 0914 (BLUE MESA LOOP TRAIL PARKING)
3.45	3.45	INTERSECTION	N/A	ROUTE 0011 (BLUE MESA ROAD)
3.45	3.45	INTERSECTION	L	ROUTE 0011 (BLUE MESA ROAD)
3.45	3.45	ONE-WAY END	N/A	N/A



# PEFO: Route Milepost Log

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## ROUTE 0012: NEWSPAPER ROCK ROAD

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

<b>FROM MILEPOST</b>	<b>TO MILEPOST</b>	<b>FEATURE</b>	<b>SIDE</b>	<b>COMMENT</b>
0.00	0.00	INTERSECTION	R	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.00	0.00	INTERSECTION	L	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.25	0.25	INTERSECTION	N/A	ROUTE 0916 (NEWSPAPER ROCK PARKING)

# PEFO: Route Milepost Log

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## ROUTE 0014: JASPER FOREST ROAD

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

<b>FROM MILEPOST</b>	<b>TO MILEPOST</b>	<b>FEATURE</b>	<b>SIDE</b>	<b>COMMENT</b>
0.00	0.00	INTERSECTION	L	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.00	0.00	INTERSECTION	R	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.25	0.25	ONE-WAY START	N/A	N/A
0.38	0.38	INTERSECTION	L	ROUTE 0917BZ (JASPER FOREST PARKING AREA B)
0.39	0.39	INTERSECTION	R	ROUTE 0917AZ (JASPER FOREST PARKING AREA A)
0.51	0.51	INTERSECTION	N/A	ROUTE 0014 (JASPER FOREST ROAD)
0.51	0.51	INTERSECTION	L	ROUTE 0014 (JASPER FOREST ROAD)
0.51	0.51	ONE-WAY END	N/A	N/A

# PEFO: Route Milepost Log

---

## ROUTE 0200: CHINDE POINT ACCESS ROAD

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

<b>FROM MILEPOST</b>	<b>TO MILEPOST</b>	<b>FEATURE</b>	<b>SIDE</b>	<b>COMMENT</b>
0.00	0.00	INTERSECTION	R	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.00	0.00	INTERSECTION	L	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.33	0.33	INTERSECTION	L	ROUTE 0903 (CHINDE POINT PARKING)
0.34	0.34	INTERSECTION	N/A	ROUTE 0903 (CHINDE POINT PARKING)

# PEFO: Route Milepost Log

---

## ROUTE 0409: OLD ROUTE 180 NORTH

Road logs are verified in Cycle 6 and mileposts for this route are matched to GPS collected in Cycle 4.

<b>FROM MILEPOST</b>	<b>TO MILEPOST</b>	<b>FEATURE</b>	<b>SIDE</b>	<b>COMMENT</b>
0.00	0.00	INTERSECTION	R	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.00	0.00	INTERSECTION	L	ROUTE 0010 (NORTH-SOUTH HIGHWAY)
0.00	0.00	INTERSECTION	N/A	ROUTE 0419 (OLD ROUTE 180 EAST)
1.31	1.31	INTERSECTION	R	ROUTE 0406 (SOUTH PIPELINE ROAD)
1.78	1.78	INTERSECTION	L	PAVED PARKING (MAINTENANCE AREA / NON NPS)
1.90	1.90	INTERSECTION	N/A	DEAD END

# Section 8 Appendix



**Petrified Forest National Park**



**Federal Lands Highway  
Road Inventory Program**

## **Improvements to the RIP Index Equations and Determination of PCR**

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In 2005, the Federal Highway Administration (FHWA) began implementing the use of a Pavement Management System (PMS) to assist the National Park Service (NPS) in prioritizing Pavement Maintenance and Rehabilitation activities. The PMS used by FHWA is the Highway Pavement Management Application (HPMA) which has the ability to store inventory and condition data from the Road Inventory Program (RIP) and forecast future performance using prediction models. Outputs include performance and condition reports at the National, Region, Park, or Route level. A regional prioritized list and optimization have been produced for most regions and the Federal Highway Deferred Maintenance is calculated via the HPMA as well.

In an effort to improve the accuracy of treatment recommendations and pavement condition descriptions the distresses and indexes that comprise the Pavement Condition Rating (PCR), an extensive study was completed throughout 2010 that has resulted in changes to the RIP condition reporting method and specifically, the calculation of PCR. It was determined that a better representation of PCR could be achieved by modifying the relative impact certain distresses would have on the overall rating.

Through the use of HPMA data, it was noted that false failure indicators existed with the existing PCR model, and that it would be necessary to reduce their impact. The distresses affected in this way were Rutting and Roughness. Conversely, experience showed that roadways with extensive cracking present were often shown to have a high PCR. Therefore, the crack index models were adjusted to be more sensitive to changes in crack severity or quantity. It was also determined that these issues were not due to a problem with data acquisition (i.e. the RIP “van”), but with the way the collected data was processed. The final change was to provide guidance on when to use the Roughness Condition Index (RCI) in the PCR calculation. Roughness data is of little value to determining overall condition on routes that, due to their length or geometrics, have lower vehicle operating speeds. Therefore, in Cycle 5, only routes that have lengths of one half mile or greater and posted speed limits of 25 mph or greater will have RCI reported and included in the PCR calculations.

Additionally, methodologies were updated in 2013 for Manually Rated Routes (paved routes that the collection vehicle is unable to drive) as well as Parking Areas to provide more accurate condition data to the HPMA. These updated methodologies allow for the efficient assessment of pavement conditions using a visual inspection method to denote specific distresses. These distresses are indicative of current conditions, the causes for current and future deterioration, and identify the level of targeted repair and rehabilitation practices required.

The changes that were implemented were endorsed by management at both the FHWA and NPS. In order to show the effectiveness of these changes, several sites were ground truth tested in early 2014 to ensure that an improvement was achieved between the relationship of PCR and the actual Maintenance and Rehabilitation needs that were represented. The changes will allow greater use of RIP and HPMA data for not simply condition data reporting, but also as a reliable tool for project identification and selection.

## Description of the Rating System

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The Federal Highway Administration, National Park Service Road Inventory Program (NPS-RIP), collects roadway condition data on paved surfaces (asphalt, concrete, brick, and cobblestone) on roads, parkways, and parking areas in national parks nationwide. The road surface condition data is collected using an automated Data Collection Vehicle (DCV) and manually using Manually Rated Route (MRR) procedures. Roads having brick or cobblestone surfacing are not normally surveyed with the DCV, but are manually rated for condition rating.

The FHWA RIP is implemented based on the premise that an accurate pavement surface condition assessment can be accomplished using automated crack detection technology as applied to digital images. Various methods of pavement condition assessment have been developed over the years with varying degrees of accuracy and acceptance. The use of digital photography to record pavement images and subsequent crack detection and classification has undergone continuous improvements over the past decade. Digital cameras with increasingly superior resolution and high definition have become more affordable, and the proprietary programming code and algorithms have been improved in crack detection software.

With the use of quality digital photography and automated crack detection software, FHWA RIP is tasked with executing a pavement condition assessment on a network of roughly 5,700 miles of National Park Service roads and parkways. Because a subset of roads will be collected multiple times this cycle, the total collection length will be around 13,000 miles. Foremost in setting up the basis of pavement distress identification is employing the distress identification protocols used by FHWA. There is no single distress identification system that is universal among entities conducting a program of distress identification. For the purpose of the NPS RIP, FHWA employs distress identification protocols that are specific to this program.

FHWA has referenced the “*Distress Identification Manual for the Long-Term Pavement Performance Program*”, Publication No. FHWA-RD 03-031, June 2003, as the point-of-reference for distress types on NPS pavement. In truth, the FHWA RIP distress types are similar to those described in the LTPP manual with some modifications. This document, “*Distress Identification Manual for the NPS Road Inventory Program, Cycle 6, 2014-2020*” was developed using the “*Distress Identification Manual for the Long-Term Pavement Performance Program*” as a guideline. Definitions of severity levels based on crack width contained in this document adhere to the LTPP Distress ID Manual. Modifications have been made to the definition of Alligator and Longitudinal Cracking and determination of Alligator Cracking severity. This manual also addresses Rutting and Roughness and its application to RIP.

Cycle 6 has launched in the spring of 2014 and will again comprise all parks, large and small, that are served by paved roads and/or parking areas. For Cycle 6, roughly 333 large and small parks will have all paved routes and parking areas collected at least once in the cycle, some will have multiple collections depending on the size of the park and the functional class of the route.

This “*Distress Identification Manual for the NPS Road Inventory Program, Cycle 6, 2014-2020*” will be used as a reference resource in crack detection and classification, determination of distress severity and extent, and in the calculation of distress index values for the FHWA RIP Cycle 6.

## Explanation of the Condition Descriptions

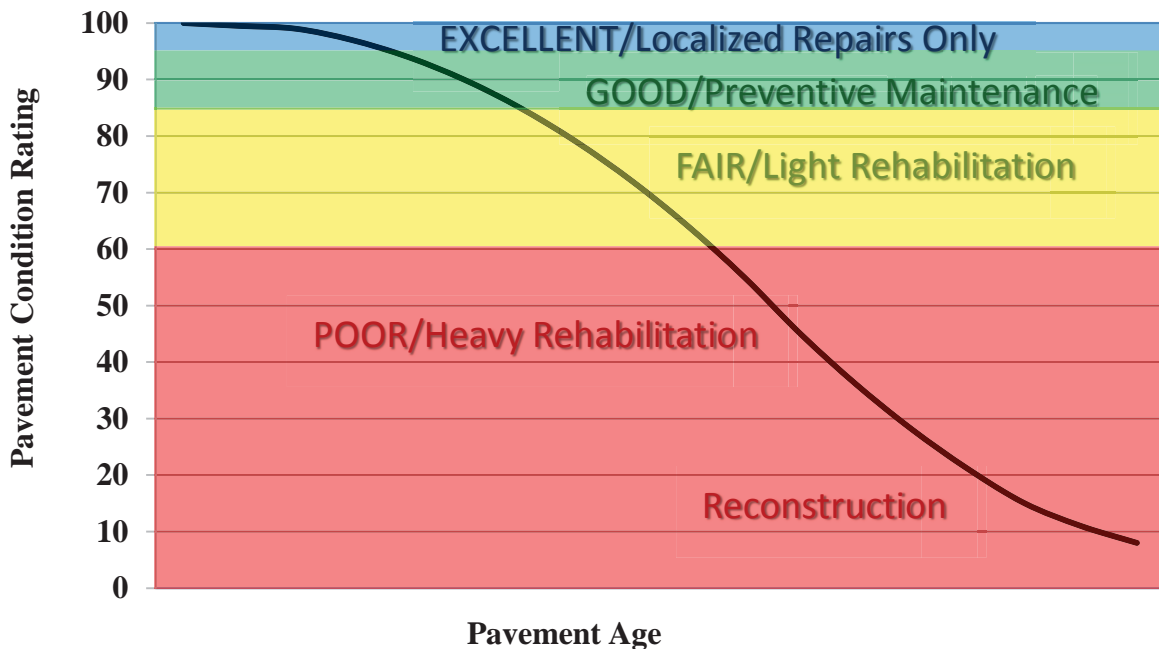
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In addition to the RIP Index changes that were implemented in Cycle 5, we will also aim to provide greater assistance in translating good/fair/poor categories into pavement needs categories. The PCR can be used to indicate the place in the Pavement Life Cycle and the types of treatments that should be considered now and into the future.

- Excellent/New: PCR of 95-100. Pavements in this range will require only spot repairs
- Good: PCR of 85-94. Pavements in this range will likely be candidates for preventive maintenance. Examples include Chip and Slurry Seals, Micro Surfacing and Thin Overlays.
- Fair: PCR of 61-84. Pavements in this range will likely be candidates of Light Rehabilitation (L3R). Examples include single-lift overlays up to 2.5 inches in total thickness, milling and overlays.
- Poor: PCR of 60 or below. Pavements in this range will likely be candidates of Heavy Rehabilitation or Reconstruction (H3R or 4R). Examples include Pulverization, Multiple Lift Overlays, and Reconstruction.

At this time, specific maintenance and rehabilitation activities should be evaluated and recommended at the project level. Site-specific conditions that influence treatment type should be determined based on performing a subsurface investigation and/or pavement condition survey, and not be based solely on RIP data. Additionally, RIP produces a snapshot of conditions the year in which the data was collected. For further information or to obtain additional PMS data from our (HPMA) please contact the Eastern Federal Lands pavement team.

### Condition Categories and Treatments





## Description of Pavement Treatment Types

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1. **Preventive Maintenance** is a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity). Preventive maintenance is typically applied to pavements in good condition having significant remaining service life. As a major component of pavement preservation, preventive maintenance is a strategy of extending the service life by applying cost-effective treatments to the surface or near-surface of structurally sound pavements. Examples of preventive treatments include asphalt crack sealing, chip sealing, slurry or micro-surfacing, thin and ultra-thin hot-mix asphalt overlay, concrete joint sealing, diamond grinding, dowel-bar retrofit, and isolated, partial and/or full-depth concrete repairs to restore functionality of individual slabs.
2. Pavement Rehabilitation consists of structural enhancements that extend the service life of an existing pavement and/or improve its load carrying capacity. Rehabilitation techniques include restoration treatments and structural overlays. Rehabilitation projects extend the life of existing pavement structures either by restoring existing structural capacity through the elimination of age-related, environmental cracking of embrittled pavement surface or by increasing pavement thickness to strengthen existing pavement sections to accommodate existing or projected traffic loading conditions. Two sub-categories result from these distinctions, which are directly related to the restoration or increase of structural capacity.
  - **Light Rehabilitation (L3R)** - Examples include single-lift overlays up to 2.5 inches in total thickness and milling and overlays for flexible pavements
  - **Heavy Rehabilitation (H3R)** – Requires rehabilitation with grade improvement. H3R stands for resurfacing, restoration, and rehabilitation projects. H3R projects typically involve multi-depth (overlays greater than 2.5 inches) pavement improvement work (short of full-depth replacement) and targeted safety improvements. H3R projects generally involve retention of the existing three-dimensional alignment.
3. **Reconstruction (4R)** is defined as the replacement of the entire existing pavement structure by the placement of the equivalent or increased pavement structure. Reconstruction usually requires the complete removal and replacement of the existing pavement structure. Reconstruction may utilize either new or recycled materials incorporated into the materials used for the reconstruction of the complete pavement section. Reconstruction is required when a pavement has either failed or has become functionally obsolete.

## **Appendix A**

### **Methodology for Determining Condition Ratings with the Data Collection Vehicle (DCV)**

## **Surface Distresses Identified by the Data Collection Vehicle**

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### **Surface Condition Rating – SCR**

Surface distresses are measured in the primary lane only. In the classification and measurement of all paved surface condition data, results will be reported in the database in record intervals of 0.02 miles (105.6 feet) (smallest granularity) along the route.

Surface distresses and rutting are determined from digital images that provide both the longitudinal and transverse profile. The images also provide an elevation profile of the road, creating a 3-dimensional image of the paved surface.

- Transverse Cracks
- Longitudinal Cracks
- Alligator Cracks
- Patching/Potholes
- Rutting

Each of the five surface distresses is assigned a computed surface distress index

- Transverse Crack Index
- Longitudinal Crack Index
- Alligator Crack Index
- Patching/Pothole Index
- Rutting Index

Surface distress data are classified as listed above, measured for severity, and quantified for extent. Classification, severity, and extent of these five surface distresses comprise the three main elements for calculation of Surface Condition Rating (SCR).

In addition to the five surface distresses, a Structural Crack Index is computed, which is a combination of the Longitudinal Crack Index and the Alligator Crack Index. The Structural Crack Index is then used in lieu of the LC and AC indices to compute SCR.

### **Roughness Condition Index - RCI**

Additional condition data measured by DCV (lasers and accelerometers)

- Roughness (IRI)

Roughness is measured by FHWA's DCV and reported as International Roughness Index (IRI) in inches/mile. Using IRI, the Roughness Condition Index (RCI) is computed.

### **Pavement Condition Rating - PCR**

Using the SCR (computed from the five surface distresses) and the RCI, an overall Pavement Condition Rating (PCR) is computed. The formula for PCR is:

$$\text{Asphalt PCR} = (0.60 * \text{SCR}) + (0.40 * \text{RCI})$$

$$\text{Concrete PCR} = \text{RCI}$$

A detailed description of each distress index formula, roughness index formula, SCR and PCR is provided in this document.

Each classified surface distress will fall into one or more severity - LOW, MEDIUM, or HIGH based on criteria listed. For each severity, an extent is established based on the measured quantity of the distress within that severity. Within each severity individual distresses are assigned a Maximum Allowable Extent (MAE). For example, LOW severity transverse cracking may be allowed up to 21.1 cracks within a 0.02 mile interval before it reaches MAE and fails.

The index formulas are based on a scale of 0 to 100. A PCR index value of 100 would indicate a “new” road with no measurable distresses or rough ride. A PCR value of 60 is determined to be terminable serviceability and the road is considered failed. The range of index values with condition descriptors is:

**POOR** = (less than or equal to 60), **FAIR**= (61 – 84), **GOOD**= (85 - 94), **EXCELLENT**= (95 - 100)

Index values are generally computed based on cumulative deducts of the measured severities. As shown in the index formulas below, as any single severity reaches or exceeds MAE, the index computes to a value of 60 or less, and the road fails for that 0.02 interval.

**Note:** *As a result of a unique combination of measured surface distresses and IRI, index values occasionally compute to less than 0 or greater than 100. In this instance, an index value less than 0 defaults to 0. Index values greater than 100 defaults to 100. For all indices, a higher value indicates a better road condition, and a lower value indicates a poorer road condition.*

On the following page, Table 1 summarizes the different types of distresses measured.

<b>ASPHALT-SURFACED PAVEMENT DISTRESS TYPES WITH RUTTING AND ROUGHNESS</b>				
<b>Distress Type</b>	<b>Units Of Measure</b>	<b>Converted To</b>	<b>Defined Severity Levels?</b>	<b>Measured By</b>
Alligator Cracking	Square Feet	Percent of Lane Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Transverse Cracking	Linear feet	Number of Cracks Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Longitudinal Cracking	Linear feet	Percent of Lane Length Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Patching / Potholes	Square Feet	Percent of Lane Per 0.02 Mile	No	3 Dimensional pavement imaging system
Rutting	Inches	Rut Depth Per 0.02 Mile	Yes	3 Dimensional pavement imaging system
Roughness	IRI	*RCI Per 0.02 Mile	No	DCV – Lasers / Accelerometers

*\*Note: Roughness is measured on concrete roadways, but surface distresses and rutting are not measured. For concrete, PCR = RCI*

**Table 1. Distress summary**

## Alligator Cracking

### **Description:**

Alligator cracking is considered a combination of fatigue and block cracking. It is a series of interconnected cracks in various stages of development. Alligator cracking develops into a many-sided pattern that resembles chicken wire or alligator skin. It can occur anywhere in the road lane. Alligator cracking must have a quantifiable area.

### **Severity Levels:**

#### **LOW**

An area with little to no interconnecting cracks with no visible spalling. Cracks are less than or equal to a mean width of 0.25 in. (6mm). Cracks in the pattern are no further apart than 1 foot (0.328 m). May be sealed cracks with sealant in good condition and a crack width that cannot be determined.

#### **MEDIUM**

An area of interconnected cracks that form a complete pattern. Cracks may be slightly spalled. Cracks are greater than 0.25 in. (6 mm) but less than or equal to 0.75 in. (19 mm) or any crack with a mean width less than or equal to 0.75 in. (19 mm) and adjacent low severity cracking. Cracks in the pattern are no further apart than 6 in. (150 mm).

#### **HIGH**

An area of interconnected cracks forming a complete pattern. Cracks are moderately or severely spalled. Cracks are greater than 0.75 in. (19mm) or any crack with a mean width less than or equal to 0.75 in. (19mm) and adjacent medium to high severity random cracking.

A combination of observed crack width and crack pattern is used to determine overall severity of alligator cracking. Based on above description of each severity, the highest level of crack width and crack pattern determines overall severity as shown in Table 2.

<b>ALLIGATOR CRACKING SEVERITY LEVELS</b>				
	<b>CRACK SEVERITY</b>	<b>CRACK PATTERN</b>		
		<b>LOW</b>	<b>MED</b>	<b>HIGH</b>
<b>CRACK WIDTH</b>	LOW	LOW	MED	HIGH
	MED	MED	MED	HIGH
	HIGH	HIGH	HIGH	HIGH

**Table 2. Alligator Crack Severity Levels**

## **Longitudinal Cracking**

### **Description:**

Longitudinal cracking occurs predominantly parallel to the pavement centerline. It can occur anywhere within the lane. Longitudinal cracks occurring in the wheelpath may be noteworthy.

### **Severity Levels:**

#### **LOW**

Cracks with a mean width less than or equal to 0.25 in. (6 mm). This also includes sealed cracks with sealant in good condition and a width that cannot be determined.

#### **MEDIUM**

Cracks with a mean width greater than 0.25 in. (6 mm) but less than 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random low severity cracking.

#### **HIGH**

Cracks with a mean width greater than 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random medium to high severity cracking.

## **Transverse Cracking**

### **Description:**

Transverse cracking occurs predominantly perpendicular to the pavement centerline. It can occur anywhere within the lane.

### **Severity Levels:**

#### **LOW**

Cracks with a mean width of less than or equal to 0.25 in. (6 mm). Sealed cracks with sealant in good condition and a width that cannot be determined.

#### **MEDIUM**

Cracks with a mean width greater 0.25 in. (6 mm) and less than or equal to 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random low severity cracking.

#### **HIGH**

Cracks with a mean width greater than 0.75 in. (19 mm). Also, any crack with a mean width less than 0.75 in. (19 mm) and adjacent random medium to high severity cracking.

## **Patching and Potholes**

### **Description:**

Patching is an area of pavement surface that has been removed and replaced with patching material or an area of pavement surface that has had additional patching material applied. Patching may encompass partial lane or full lane width. On full lane width patching; the total, contiguous length of patch may not exceed 0.100 mi. (0.161 km). (Any full-lane patch exceeding 0.100 mi. in length is considered a pavement change). Patching must have a quantifiable area.

Potholes are bowl-shaped holes of various sizes occurring in the pavement surface.

Manhole covers should not be rated as patches unless there is obvious patching around the manhole.

Speed bumps should not be rated as patches

### **Severity Levels:**

There are no stratified severities for Patching and Potholes. They either are present or they are not.

## **RUTTING**

### **Description:**

Rutting is a longitudinal surface depression in the wheelpath.

### **Severity Levels:**

#### **LOW**

Ruts with a measured depth of 0.20 inches to 0.49 inches  
Ruts less than 0.20 in. are not included in the distress calculations.

#### **MEDIUM**

Ruts with a measured depth of 0.50 inches to 0.99 inches

#### **HIGH**

Ruts with a measured depth greater than 1.00 inch



## **ROUGHNESS**

### **Description:**

Roughness is the measurement of the unevenness of the pavement in the direction of travel. It is measured in units of IRI (International Roughness Index), inches per mile, and is indicative of ride comfort.

### **Severity Levels:**

There are no stratified severity levels for roughness. The roughness (or smoothness) of a road surface can be defined by IRI in the following table.

<b>IRI DESCRIPTIONS</b>	
<b>Type of Road</b>	<b>Typical IRI (in/mile)</b>
New Road, no noticeable roughness	<90
Small level of roughness	90 – 126
Road of average roughness	126 – 190
Road with above average roughness	190 – 253
Road with severe roughness	253 – 380
Nearly impassable	>380

**Table 3. International Roughness Index**

### **Roughness Collection Parameters**

On shorter roads with a lower speed limit the usefulness in collecting and reporting IRI is negligible. Lower, inconsistent speeds can lead to a less accurate IRI value. Therefore RIP has put in place the following protocols for reporting IRI.

International Roughness Index (IRI) is not reported on routes with the following criteria:

- Posted speed limit is less than 25 mph
- Length of route is less than 0.50 miles

When a collected route has a posted speed limit of at least 25 mph and length of at least 0.50 miles, IRI will be collected except on road sections where the speed is less than 20 mph

Other situations may arise where the speed and length factors are met, but reporting IRI could lead to an inaccurate PCR. RIP will determine whether or not it is reasonable to report IRI on these routes on a case by case basis.

## **Index Formulas**

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*Note: All index formulas listed below contain MAE applicable to 0.02 mile (105.6 feet) interval.*

### **Alligator Crack Index**

$$\text{AC\_INDEX} = 100 - 40 * [(\% \text{LOW} / 35) + (\% \text{MED} / 15) + (\% \text{HI} / 5)]$$

#### **Where:**

The values %LOW, %MED and %HI report the percentage of the observed pavement (0.02 mile, primary lane) that contains alligator cracking within the respective severities. These values range from 0 to 100.

%LOW = Percent of total area (primary lane, 0.02 in length), low severity

%MED = Percent of total area (primary lane, 0.02 in length), medium severity

%HI = Percent of total area (primary lane, 0.02 in length), high severity

Percent of total area is computed as:

$$\frac{\text{square foot area of alligator crack severity}}{(0.02 \text{ mile}) * (\text{lane width})}$$

In AC\_INDEX, the denominators 35, 15, and 5 are the Maximum Allowable Extents (MAE) for each severity. In other words, we will allow up to 35% of low severity alligator cracking for a 0.02 interval before failure, 15% for medium severity, and so on. As you can see, if any single severity reaches MAE the resulting index value is 60, or failure.

### **Longitudinal Crack Index**

$$\text{LC\_INDEX} = 100 - 40 * [(\% \text{LOW} / 175) + (\% \text{MED} / 75) + (\% \text{HI} / 25)]$$

#### **Where:**

The values %LOW, %MED, and %HI report the length of longitudinal cracking within each severity as a percent of the section length (0.02 mile, primary lane). These values are greater than or equal to 0 and can exceed 100.

%LOW = Percent of interval length (primary lane, 0.02 in length), low severity

%MED = Percent of interval length (primary lane, 0.02 in length), medium severity

%HI = Percent of interval length (primary lane, 0.02 in length), high severity

Percent of interval length is computed as:

$$\frac{\text{length of respective longitudinal cracking}}{(0.02 \text{ mile}) * (105.6 \text{ ft.})}$$

In LC\_INDEX, the denominators 175, 75, and 25 are the Maximum Allowable Extents (MAE) for each severity. In other words, we will allow up to 175% of low severity longitudinal cracking for a 0.02 interval before failure, 75% for medium severity, and so on. As you can see, if any single severity reaches MAE the resulting index value is 60, or failure.

## **Structural Crack Index**

$$SC\_INDEX = [100 - ((100 - AC\_INDEX) + (100 - LC\_INDEX))]$$

Structural Crack Index is a combination of Alligator Cracking and Longitudinal Cracking, and is used in the SCR formula in lieu of AC and LC separately.

## **Transverse Crack Index**

$$TC\_INDEX = 100 - 40 * [(LOW / 21.1) + (MED / 4.4) + (HI / 2.6)]$$

### **Where:**

The values LOW, MED and HI report a count of the total number of transverse cracks (reported to three decimals) within each severity level, where one transverse crack is equal to the lane width. These values are greater than or equal to 0.

LOW = Number of cracks in interval (primary lane, 0.02 in length), low severity

MED = Number of cracks in interval (primary lane, 0.02 in length), medium severity

HI = Number of cracks in interval (primary lane, 0.02 in length), high severity

Number of cracks is computed as:

$$\frac{\text{Total length of transverse cracks}}{\text{Lane width}}$$

In TC\_INDEX, the denominators 21.1, 4.4, and 2.6 are the Maximum Allowable Extents (MAE) for each severity. In other words, we will allow up to 21.1 low severity transverse cracks for a 0.02 interval before failure, 4.4 cracks for medium severity, and so on. As you can see, if any single severity reaches MAE the resulting index value is 60, or failure.

## **Patching Index**

$$PATCH\_INDEX = (100 - 40) * (\%PATCHING / 80)$$

### **Where:**

The value %PATCHING reports the percentage of the observed pavement (0.02 mile, primary lane) that contains patching/potholes. This value ranges from 0 to 100.

%PATCHING = Percent of total area (primary lane, 0.02 in length)

Percent of total area is computed as:

$$\frac{\text{square foot area of patching/potholes}}{(0.02 \text{ mile}) * (\text{lane width})}$$

There are no severity levels for patching. It either exists or does not.

There are no severity levels for patching. It either exists or does not. In PATCH\_INDEX, the denominator 80 is the Maximum Allowable Extent (MAE) for each severity. In other words, we will allow up to 80% patching for a 0.02 interval before failure. As you can see, if patching/potholes reaches MAE the resulting index value is 60, or failure.

## **Rutting Index**

$$\text{RUT\_INDEX} = 100 - 40 * [(\% \text{LOW} / 535) + (\% \text{MED} / 205) + (\% \text{HI} / 40)]$$

### **Where:**

20 rut depth measurements are taken per 0.02 interval for each of 2 wheel paths (left and right), resulting in a total of 40 measurements taken for both wheel paths. Each wheelpath is analyzed independently for rut severities. The values %LOW, %MED and %HI report the percentage of the 40 measurements within that severity. These values range from 0 to 200.

%LOW = Percent of LOW ruts in left wheelpath based on 20 ruts, plus percent of LOW ruts in right wheelpath based on 20 ruts.

%MED = Percent of MED ruts in left wheelpath based on 20 ruts, plus percent of MED ruts in right wheelpath based on 20 ruts.

%HI = Percent of HI ruts in left wheelpath based on 20 ruts, plus percent of HI ruts in right wheel path based on 20 ruts.

Percent of rut measurements within each severity can also be computed as:

$$\frac{\text{(total number of ruts within each severity in both wheelpaths)}}{20} \times 100$$

In RUT\_INDEX, the denominators 535, 205, and 40 are the Maximum Allowable Extents for each severity; Low, Medium, and High, respectively. Only the MAE for high severity rutting can fail a section, since 200% of *only* low severity ruts would yield a rut index of 85 and 200% of *only* medium severity ruts would yield a rut index of 61.

## **Roughness Condition Index (Asphalt)**

$$\text{RCI} = 32 * [5 * (2.718282^{(-.0041 * \text{AVG IRI}))}]$$

### **Where:**

The value AVG IRI reports the average value of the Left IRI and Right IRI measurements for the interval (0.02 mile, primary lane). This value can range from approximately 40 to 999.0.

Average IRI is computed as:

$$\frac{(\text{Left wheelpath IRI}) + (\text{Right wheelpath IRI})}{2}$$

There is no applicable threshold for failure for this index.

## **Roughness Condition Index (Concrete)**

$$\text{RCI} = (-0.0012)(\text{IRI}^2) + (0.0499)(\text{IRI}) + 99.542$$

For concrete, PCR = RCI

## **Surface Condition Rating Index**

**SCR** = Lowest Index Value Of: [SC\_INDEX, TC\_INDEX, PATCH\_INDEX, RUT\_INDEX]

*Note: The modified SCR equation above combines AC\_INDEX and LC\_INDEX, and considers that a single AC/LC index value of the Structural Crack Index (SC\_INDEX). The lowest of the four computed index values (SC\_INDEX, TC\_INDEX, PATCH\_INDEX, or RUT\_INDEX) becomes the SCR.*

### **Where:**

See above for determinations of SC\_INDEX, TC\_INDEX, PATCH\_INDEX and RUT\_INDEX.

The threshold for failure for this index is SCR = 60. Data Collection Vehicle Subsystems

Data on paved roads is collected by FHWA using a Pathway Services Inc. Data Collection Vehicle (DCV), called a PathRunner. The DCV is driven in the primary-direction lane at posted speed limits and less.

## **Cameras**

Forward-facing and rear-facing video is collected as jpeg digital imagery files at a frequency of every 26.4feet.

Two forward-facing cameras are mounted above the vehicle cab, one pointed straight ahead and the other to the right shoulder providing seamless roughly 120 degree viewing. A third camera is mounted in the rear of the vehicle, recording the left shoulder.

<b>CAMERA SPECIFICATIONS</b> <b>TWO FORWARD / ONE REAR FACING CAMERA</b>	
Camera lens/type	Prosilica GT 2750 (GigE Technology)
Image format	*.jpg
Image resolution	2750 x 2200, 18 frames/second
Image pixel size	depends on distance
Zoom ratio	16mm Fixed
Iris range	Aperture Range F 1.8 – Infinity (P-Iris, Automatic)

## **Pavement Imaging and Rutting**

High resolution rutting data and surface imaging are collected in a single data stream using a three-dimensional (3D) pavement surface transverse profile data acquisition system. The 3D camera captures a laser line as it is projected over the pavement surface and uses the location of this line to measure the height deviations of the pavement surface. These height deviations can be used to calculate rutting in both wheelpaths. These deviations also provide a grayscale image detailing the change in height throughout the surface, i.e. providing depth measurements for cracking.

<b>THREE-DIMENSIONAL PAVEMENT SURFACE AND TRANSVERSE PROFILE DATA ACQUISITION SYSTEM</b>	
<b>Surface Image Specifications</b>	
Image size	1536 pixels/scan @ 3000 Hz
Image width	4 meters (3950 mm nominal)
Laser class	3B
Power	16W (Two lasers @ 8W Ea)
Vehicle speed limitations	62 mph
Environment	Dry pavement, day or night
Sensor size (approximate)	1536 pixels x 512 pixels
Image display length	26.4 feet
<b>Rutting Specifications</b>	
Reported rut depth units	Inches
Vehicle speed limitations	Up to 62 mph
Sampling rate	3000 profiles/second
Transverse resolution	1536 points/profile
Transverse field-of-view	14 feet
Depth accuracy (nominal)	<1mm
Environment	Dry pavement, day or night, above 32 degrees F
Adherence to specifications	ASTM E1703M-95 (reapproved 2005)

### **Distance Measuring Instrument (DMI)**

The DMI (Distance Measuring Instrument) obtains road length measurements that are accurate to 0.15% for speeds up to 60 mph. The DMI is connected to the hub of the rear wheel on the driver's side, and is calibrated to the revolutions of the rear vehicle axle on a regular basis.

## **Roughness (IRI)**

<b>IRI SPECIFICATIONS</b>	
Reported IRI units	Inches/mile
Vehicle speed limitations	12-62 mph
IRI equipment certification	Texas Transportation Institute (TTI)
Wavelengths accommodated	0.5 feet to 300 feet
IRI computed & reported	World Bank Technical Paper Number 46
Environment	Dry pavement, day or night, above 32 degrees
Adherence to specifications	ASTM E950 Class 1 & AASHTO M 328

The collection system includes a South Dakota type laser profiler manufactured based on active Class 1 ASTM E950 standards. The dynamic profile of the pavement surface is collected from which the IRI roughness data is computed. The sensors include one accelerometer on each wheelpath, one height sensor (laser) on each wheelpath, and a distance transducer.

## **GPS & Inertial Systems**

GPS is collected by an onboard system employing Omnistar real time correction and a spinning gyroscope to provide accurate positioning data in instances of satellite obstruction. All GPS coordinates are tied to an image and linear distance measurements.

<b>GPS SPECIFICATIONS</b>	
Static accuracy	Sub-meter
Dynamic accuracy	2-3 meters
Receiver	12 satellite tracking
Coordinate system	Lat Lon WGS 84
Environment	Day or night
Cross-slope	± 1.75%
Grade	± 1.75%
Adherence to specifications	ASTM E1703M-95 (reapproved 2005)

\*NOTE – GPS accuracy is dependent on many different factors. Satellite constellation, tree coverage, GPS receiver quality, and real-time correction availability can all affect the locational and elevation accuracies. The elevation (z coordinate) accuracy is less dependable than locational or horizontal accuracy (x/y coordinates or latitude/longitude). In areas of heavy tree coverage or poor satellite constellations, elevation data can vary by as much as +/- 100 feet.



**Appendix B**

**Methodology for Determining Condition Ratings  
Using Manual Rating Procedures**

## Description of Manual Rating Methods

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In 2013, the Federal Highway Administration updated existing Manual Rating Procedures in an effort to better align pavement conditions for Manually Rated Routes and Parking with the Highway Pavement Management Application (HPMA). HPMA is the Pavement Management System used by the FHWA to store inventory and condition data from the Road Inventory Program (RIP) and forecast future performance using prediction models. HPMA uses pavement condition data (collected by the Road Inventory Program) to develop life cycles for pavements and recommend treatments to maximize useable pavement life while minimizing costs associated with maintenance and repair.

The Federal Highway Administration (FHWA) developed a set of manual rating methods for pavement that are appropriate for Federal Roadways. Two different methods were developed for linear roads and a separate method was developed for parking areas and nonlinear roads. These methods employ a 0 to 100 rating scale and improve consistency and objectivity in the manual evaluation of surface distresses. They are compatible with ratings that are collected by the automated Data Collection Vehicle (DCV).

- The first of the two manual evaluation methods for roads uses rating criteria to assign index values to each distress type based on a visual evaluation of severity and extent.
- The second manual evaluation method for roads is very time demanding and is best employed on only a select set of routes which may have the highest visitor use and require a more intensive assessment. This method will be used for the Manual Rating of Function Class 1, 2, 7, and 8 Roads. This method is based on measurements that are recorded for each instance of a surface distress. These measurements are converted into index values using conversion formulas.
- Parking areas and non-linear roads are rated similar to the first method shown above, however, there are some slight differences due to the non-linear nature.

The details and criteria used for each of these rating methods are outlined below.

## **Visual Inspection Method for Manually Rating Secondary Roads**

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The visual inspection method for manually rated roads uses condition rating criteria that have been developed by FHWA. This criteria is based on a visual evaluation of the severity and extent of distresses to determine the overall condition of the roadway. This method is used for secondary roads that are Functional Class 3, 4, 5, and 6. This constitutes the majority of manually rated roads collected by the Road Inventory Program.

### **Rating Section Lengths**

For this method, Manually Rated Roads are rated in sections. These sections may be made based on length of changes in surface type or condition as described below. The ratings are then aggregated to give an overall rating for the Route:

- Rating sections should be no longer than 0.25 miles in order to keep the area being rated manageable.
- A new rating section may be started based on changes in condition, width, or surface type if these changes represent a significant portion of the route (are not isolated instances).
- If the road condition, width, and surface type remain constant then new sections do not need to be created unless the road exceeds 0.25 miles.

### **Rating Criteria**

For this method, Manually Rated Roads are evaluated using a visual inspection of the six distress types listed below. Each distress is assigned one of five index values. An overall Surface Condition Rating (SCR) and Pavement Condition Rating (PCR) are calculated based on these index values.

- Alligator Cracking
  - Rating based on percentage of road surface affected
- Longitudinal Cracking
  - Rating based on severity level (crack width) and percentage of road section length of longitudinal cracks
- Transverse Cracking
  - Rating based on crack width, crack spacing, and percentage of surface affected
- Patching
  - Rating based on percentage of road surface affected
- Rutting
  - Rating based on percentage of road section length affected by visible rutting (>1 inch depth) that requires remediation
- Roughness
  - Manual assessments of roughness are not made due to the subjectivity of the measurement. Therefore, roughness is not incorporated into the PCR calculation of manually rated roads.

Concrete Routes also receive a PCR rating based on visual evaluation of the following six distress types.

- Slab Faulting at Joints
- Slab Cracking and breakup
- Surface Delamination and Pop-outs
- Joint Distresses
- Patching

## **Distress Measurement Method for Manually Rating Primary Roads**

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A more intensive and time demanding assessment than our standard method was developed for Primary roads that are functional class 1, 2, 7, or 8. These high visitation roads are usually accessible by the automated Data Collection Vehicle but in rare instances may need to be manually rated. The method developed is based on measuring each instance of a distress. These measurements are totaled over each section length being measured and are then converted into index values between 0 and 100 (100 being a road with no distress) using index formula equations outlined below. The goal of this method is to produce measured index values which are directly comparable to the automated DCV.

### **Rating Section Lengths**

For the distress measurement method roads are broken into sections in order to rate. Distress measurements are totaled for each section separately in order to determine the index value for that particular section. The section length to be rated is determined based on the following rules:

- Rating sections are between 0.25 and 0.50 miles long
- A new rating section is created if there is a significant change in condition or pavement width
- If there are no significant changes in condition or pavement width, rating sections are broken at equal intervals, typically 0.50 miles

### **Manual Distress Measurements**

#### **Alligator Cracking**

- Alligator cracking is measured by area (square feet). Instances of Alligator cracking are measured along the length and multiplied by the average width of the distressed area.
- The index for alligator cracking takes the total area of cracking compared to the interval length and converts it to a percentage. That percentage is then input into an index formula that yields a value between 0 and 100 (0 being the most distressed).
- Severity levels are not defined for manually measured Alligator cracks. The Alligator Crack Index formula is calculated based on an assumption of medium severity.

#### **Longitudinal Cracking**

- Longitudinal cracking (cracking in the direction parallel to the roadway) is measured by length (ft.).
- The index for longitudinal cracking takes the total length of cracking compared to the interval length and converts it to a percentage broken down by severity. That percentage is then input into a formula that yields a value between 0 and 100 (0 being the most distressed).
- Two severity levels are defined for manually measured Longitudinal Cracks. Lower severity cracks are those with a mean width of less than 0.25 inches. Sealed cracks with sealant in good condition are also considered lower severity. Higher severity cracks are those with a mean width of greater than 0.25 inches.

#### **Transverse Cracking**

- Transverse cracking (cracking in the direction perpendicular to the roadway) is measured by length (ft).
- The index for transverse cracking takes the total number of cracks (1 crack would encompass the full lane) broken down by severity. The total numbers of each severity are then put into a formula that yields a value between 0 and 100 (0 being the most distressed).
- Two severity levels are defined for manually measured Transverse Cracks. Lower severity cracks are those with a mean width of less than or equal to 0.25 inches. Sealed cracks with sealant in

good condition are also considered lower severity. Higher severity cracks are those with a mean width of greater than 0.25 inches.

### **Patching and Potholes**

- Patching and Potholes are measured by area (square feet). Instances of Patching are measured along the length and multiplied by the average width of the patch.
- Instances of full lane width patching cannot be longer than 0.100 miles, otherwise it should be considered a pavement change rather than a distress.
- There are no stratified severities for Patching. It is either present or it is not.

### **Rutting**

- Visible rutting is measured by length (ft.) in each wheel path. Only visible ruts are rated, which are ruts greater than 1 inch deep.
- All rutting recorded in a manual rating is considered to be high severity (> 1 inch). Lesser severities are generally not distinguishable in a visual inspection.

### **Roughness**

- Manual assessments of roughness are not made due to the subjectivity of the measurement. Therefore, roughness is not incorporated into the PCR calculation of manually rated roads.

## **Index Formulas for Distress Measurement Method:**

The method used to convert distress measurements into index values is shown below. The Surface Condition Rating and Pavement Condition Rating are calculated based on these index values.

### **Alligator Crack Index for Manual Rating:**

$$AC\_INDEX = 100 - 40 * (\%ALLIGATOR / 15)$$

#### **Where:**

%ALLIGATOR = Percent of total area of section being rated that contains Alligator cracking.

### **Longitudinal Crack Index for Manual Rating:**

$$LC\_INDEX = 100 - 40 * [(\%LOW / 175) + (\%MED / 75)]$$

#### **Where:**

%LOW = Percent length of longitudinal cracks where crack width less than or equal to 0.25 inches

%HIGH = Percent length of longitudinal cracks where crack width greater than 0.25 inches

### **Transverse Crack Index for Manual Rating:**

$$TC\_INDEX = (100 - 40) * [(LOW / 21.1) + (MED / 4.4)]$$

#### **Where:**

LOW = Count of the total number of transverse cracks within the section length where one transverse crack is equal to the lane width and the crack width <= 0.25 inches

HIGH = Count of the total number of transverse cracks within the section length where one transverse crack is equal to the lane width and the crack width > 0.25 inches

Number of cracks is computed as:  
Total length of transverse cracks/Lane width

**Patching Index for Manual Rating:**

$$\text{PATCH\_INDEX} = (100 - 40) * (\% \text{PATCHING} / 80)$$

**Where:**

**%PATCHING** = Percentage of pavement section that contains patching/potholes.

**Rutting Index for Manual Rating:**

$$\text{RUT\_INDEX} = 100 - 40 * (\% \text{RUTTING} / 40)$$

**Where:**

**%RUTTING** = Percentage length of high severity rutting within the section being measured.

## **Method for Manually Rating Paved Parking Areas and Non-Linear Roads**

Parking areas are evaluated based on a visual inspection using condition rating criteria that has been developed by FHWA. This criteria is based on a visual evaluation of the severity and extent of distresses to determine the overall condition of the parking area. This overall condition rating is linked to the level of repair and rehabilitation practices required.

A distress index is determined for each of the distresses listed below for Asphalt and Concrete Parking areas. The overall Pavement Condition Rating (PCR) of the parking lot is driven by the most severe distress present.

### **Rating Criteria:**

#### **Asphalt Parking Distress Types**

- Alligator Cracking
  - Rating based on percentage of road surface affected
- Longitudinal, Transverse and Block cracking
  - Rating based on crack width, crack spacing, and percentage of surface affected
- Rutting and Distortions
  - Rating based on percentage of road surface affected
- Hot Mix Asphalt Patches
  - Rating based on overall percentage of HMA patches
- Potholes and Cold Patches
  - Rating based on percentage of road surface affected
- Surface Raveling and Bleeding
  - Rating based on percentage of road surface affected

#### **Concrete Parking Distress Types**

- Slab Faulting at Joints
  - Rating based on height differential between adjacent slabs or pieces of broken slabs
- Slab Cracking and breakup
  - Rating based on quantity of cracks and if slab is acting to able distribute load as designed
- Surface Delamination and Pop-outs
  - Rating based on percentage of road surface affected to include pop-outs, spalls and surface delamination
- Joint Distresses
  - Rating based on sealant condition and concrete distresses at/or adjacent to joints
- Patching
  - Rating based on percentage of road surface affected

## **Curb Inspection and Treatments**

During inspections of manually rated parking lots and routes, the curb reveal and overall curb condition are evaluated. The curb condition is used to determine a recommendation.

### **Curb Reveal**

The vertical distance on the curb face from the gutter flow line or pavement surface to the top of curb. When resurfacing adjacent to curb, the resulting curb reveal should be no less than 4 inches. Additionally, when resurfacing adjacent to a gutter, the resulting pavement surface should be flush with the gutter pan. In cases where a resurfacing would violate either of these parameters, the surface may need to be milled or removed to adjust to these field conditions.

### **Curb Recommendations**

The following treatment categories are based on the overall percentage of distresses along the entire curb structure for a specific pavement structure. Distresses include spalling, cracking, loss of material and any other damage which prevents the curb from conveying storm runoff or failing to perform in its intended function.

- Overall curb damage ranging 0%-5%:
  - DO NOTHING
- Overall curb damage ranging 5%-20%
  - LIGHT REPAIR
- Overall curb damage ranging 20%-50%
  - MODERATE REPAIR
- Overall curb damage greater than 50%:
  - REPLACE



## GPS for Manually Rated Roads and Parking

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GPS information for Manually Collected Cycle 6 Routes will be recorded using the latest hardware and software by TRIMBLE 6000 Series GeoXT. Cycle 6 GPS collection units will allow access to GPS and GLONASS, improving overall GPS reliability, accuracy and precision to submeter accuracy.

Additionally, the new GPS units have an enhanced ability to collect accurate signals underneath tree cover or adjacent to buildings or natural terrain with extreme vertical gradations that typically reduce GPS accuracy. Trees and buildings create “satellite shadows”, limiting the areas where you can reliably collect high-accuracy GPS data. The updated GPS receiver will deliver improved usable data under tree canopy or in natural or urban canyons. Routes that were previously collected accurately will not be recollected in Cycle 6.

<b>TRIMBLE 6000 SERIES GeoXT GPS SPECIFICATIONS</b>	
Receiver	Trimble Maxwell™ 6 GNSS chipset
Channels	220 channels
Systems	GPS / GLONASS / WAAS
Accuracy	Sub-meter
Operation Temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Cellular and Wireless	UMTS / HSDPA / GPRS / EDGE / Wi-Fi / Bluetooth
Internal Still Camera w/ GEOTAG ability	Autofocus 5 MP (JPG) and WMV w/ Audio

**Appendix C**  
**Description of Cycle 6 Deliverables**

## **Interim Report Delivery**

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Partial report will be primarily focused on manually collected routes. The report will be released approximately four months after manual collection of parking lots and other manually collected routes to provide NPS an immediate report on the condition of routes collected manually.

The Interim Report Delivery consists of an Interim Report PDF that contains the following:

- Parking lot and manually rated route conditions
- Route ID Reports
- Route ID Changes Report.

Please note that since the Data Collection Vehicle will have not collected data at this point in time, the following will not be in the Interim Report:

- No park summary information will be provided in the report
- No DCV data will be provided in report
- No road logs will be provided in report
- No maps will be provided in report
- Any mileages collected will be approximate

All data provided in the Interim Report will also be included in the Final Report.

## Final Report Delivery

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The Final Report will contain all data collected by Manual Inspection and the Data Collection Vehicle. All information provided in the Interim Report will be included in the Final report. Manually collected information reported in the Interim Report may be updated in the Final Report if pavement conditions have substantially changed between the Manual Inspection and Data Collection Vehicle Inspection or other unforeseen circumstances.

The final report will be released approximately 8 months after the Data Collection Vehicle completes its collection of that specific park.

Data included in the Final Report package consists of the following:

- **Condition Photos:** All photos taken during Cycle 6.
- **Data Video:** Data and video of each route collected by the DCV will be viewable through PATHVIEW software. PATHVIEW Software and training will be provided to NPS personnel by Eastern Federal Lands.
- **GPS on All Rated Routes:** All GPS data collected from the DCV will be provided. Parking areas, some roads, and other paved areas that are not fully drivable with the DCV are collected manually by field technicians. GPS is collected for these routes using portable Trimble GPS units.
  - GPS will be provided as Shapefiles and KMLs
  - All GPS data related to road collection will be linear referenced to the collected length
- **Geodatabase – Background and Metadata:** In addition to this park report, a geodatabase containing both tabular and spatial data specific to this park has been provided.
  - All data disseminated in the preceding report has been obtained from the tables and fields within said geodatabase. The geodatabase can be referenced for tabular data via Microsoft Access or for both tabular and spatial data via ESRI's ArcGIS Suite of software which consists of; ArcMap, ArcCatalog and ArcExplorer.
  - Consolidating the RIP data into one database creates a seamless relationship of tables and geographic data. It allows RIP to facilitate easier updates and enhancements in the future. A geodatabase can be thought of as simply a database containing spatial data. A complete and thorough description of the tables and fields contained within this geodatabase can be found in the metadata. The metadata is attached directly within the geodatabase and can be accessed via ESRI's ArcCatalog.
- **Report (RIP Report and Route ID):** A PDF report will be provided that includes a list of all routes and key data. Condition reports for each route will be included. All changes, additions and deletions to any route will be included in the report. Features along routes will not be collected in Cycle 6.

## **Partial DCV Collections**

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Additional Partial DCV Collections may be done on specific parks depending on their size and overall mileage of routes within its boundaries during Cycle 6. Parks with greater than 10 miles of paved roadways will receive at least one additional Partial DCV collection during Cycle 6. Data collected during these Partial DCV Collections will not result in the delivery of an additional report to the park.

Data collected by the DCV during Partial DCV Collection will be used to improve HPMA modeling by providing additional “snapshots in time” of park pavement conditions. This improved HMPA modeling will assist in the programming and budgeting of future projects which will help maximize the life of pavement infrastructures.

Instead of receiving a report of conditions collected during the Partial DCV collection, the park will receive a formal letter from the Road Inventory Program requesting coordination for the additional Partial DCV collection, identifying the dates of the Partial DCV Collection and will reinforce the purpose and importance of the Partial DCV Collection.

**Appendix D**  
**Glossary of Terms and Abbreviations**

## Glossary of Terms and Abbreviations

TERM OR ABBREVIATION	DESCRIPTION OR DEFINITION
AC	Alligator Cracking
CRS	Condition Rating Sheets (Section 5)
Curb Recommendation	Curb remediation based on overall percentage of curb distress
Curb Reveal	Height of curb exposed from gutter flow line to top of curb
DCV	Data Collection Vehicle
Excellent	Excellent rating with an index value of 95 to 100
Fair	Fair rating with an index value from 61 to 84
FUNCT_CLASS	Functional Classification (see Route ID, Section 2)
Good	Good rating with an index value from 85 to 94
IRI	International Roughness Index
HPMA	Highway Pavement Management Application
Lane Width	Width from road centerline to fogline, or from centerline to edge-of-pavement when no fogline exists
LC	Longitudinal Cracking
MRR	Manually Rated Route
MRL	Manually Rated Line
MRP	Manually Rated Polygon
N/A	Not Applicable
NC	Not Collected
PATCH	Patching and Potholes
Paved Width	Width from edge-of-pavement to edge-of-pavement
PCR	Pavement Condition Rating
PKG	Parking Area
Poor	Poor rating with an index value of 0 to 60
RCI	Roughness Condition Index
SC	Structural Cracking
SCR	Surface Condition Rating
TC	Transverse Cracking