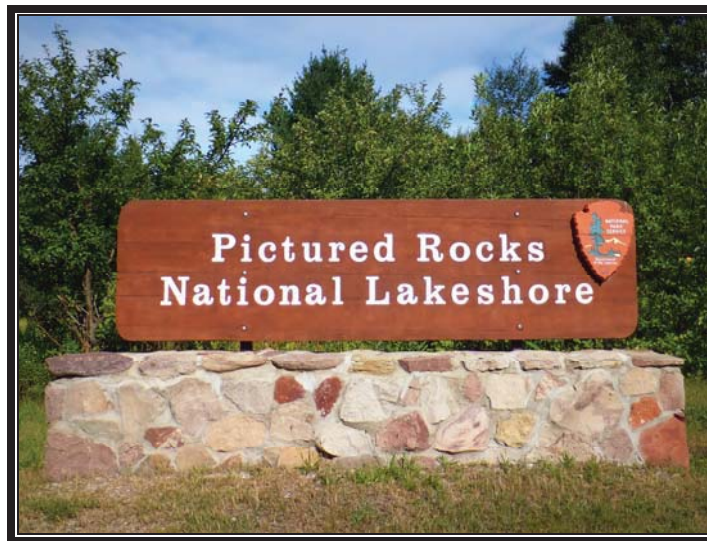




Federal Lands Highway Road Inventory Program

Road Inventory and Condition Assessment



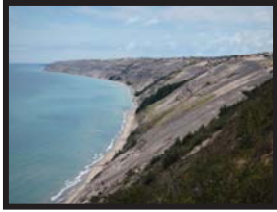
Pictured Rocks National Lakeshore PIRO

Cycle 5 Report

**Prepared By: Federal Highway Administration
Road Inventory Program (RIP)
Data Collected: 09/2012
Report Date: 04/2013**

Pictured Rocks National Lakeshore in Michigan





DCV = Data Collection Vehicle

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Section 1 Introduction



Pictured Rocks National Lakeshore



Federal Lands Highway
Road Inventory Program

INTRODUCTION

The Federal Highway Administration, (FHWA), in the mid 1970s, was charged with the task of identifying surface condition deficiencies and corrective priorities on National Park Service (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 an MOA (Memorandum Of Agreement) which established the RIP (Road Inventory Program). This MOA was terminated and revised in 1980 to establish a new MOA aiming to update RIP data and develop a long-range program to improve and maintain NPS roads to designated condition standards and establish a maintenance management program.

The FHWA completed this initial phase of the RIP in the early 1980s. As a result of this effort, each NPS site included in the study received a RIP Report known as the “Brown Book” which included the information collected during this first RIP phase.

In the 1990s, the effort was again renewed to update and maintain the RIP data. By this time the computer age was upon us and a process was employed that relied heavily on electronic data collection and computer technology. A cyclical program was developed and the RIP completed two cycles of data collection from 1994 to 2001. Cycle 1, starting in 1994, was conducted in 44 “large parks” (parks containing 10 or more paved route miles). Cycle 2 began in 1997 and comprised 79 large parks and 5 small parks totaling 4,874 paved route miles. Each of these parks received a RIP Report known as the “Blue Book”. Cycle 3, from 2001 to 2004, was conducted in all parks, large and small, that contained any paved routes, including parking areas and, again, each park received a RIP Report and associated electronic files.

Cycle 4 was initiated in the spring of 2006 covering 86 large parks and several associated small parks consisting of 5,553 paved route miles and 6,232 paved parking areas. Data collection has been completed for Cycle 4 and all data has been delivered to the NPS.

In 2005, the FHWA began implementing the use of a Pavement Management System (PMS) to assist the NPS in prioritizing Pavement Maintenance and Rehabilitation activities. The PMS used by FHWA is the Highway Pavement Management Application (HPMA) and this software 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. A regional prioritized list and optimization have been produced for most regions and the Federal Highway Deferred Maintenance is calculated via the HPMA.

In an effort to improve the accuracy of treatment recommendations and pavement condition descriptions, an extensive study was completed throughout 2010 that has resulted in changes to the RIP condition reporting method, specifically the distresses and indexes that comprise the Pavement Condition Rating (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. The changes that were implemented were endorsed by management at both the FHWA and NPS in October 2010. These 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. Because of these changes, the PCR Condition ratings reported in Cycle 5 do not directly relate to the condition ratings reported in previous cycle RIP Reports. For more detailed information about the changes, see Section 3 and Section 10 in this RIP Report.

Cycle 5 has launched in the summer of 2010 and will again comprise all parks, large and small, that are served by paved roads and/or parking areas. For Cycle 5, the decision was made to collect condition data in large parks on Functional Class 1, 2, and 7 paved routes only, as well as any new routes that were previously not collected. In small parks, all paved routes and parking areas will be collected. As a result, this will include 81 large parks with 4,459 paved route miles and 231 small parks with 529 paved route miles and associated paved parking areas.

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 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.

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
(703) 404-6371

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

Section 2 Park Route Inventory



Pictured Rocks National Lakeshore



Federal Lands Highway
Road Inventory Program

Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 04/10/2013

(Numerical By Route #)

Page 1 of 6

Shading Color Key:

White = Paved Routes, DCV Driven

Yellow = Unpaved Routes, DCV not Driven

Blue = All Paved Parking Areas

Green = All Unpaved Parking Areas

Red text denotes approx. mileage

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Black = State, Local or Private non-NPS Routes

■ = Concession Route Flag ON

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

** DCV - Data Collection Vehicle NC - Not Collected

PIRO

PICTURED ROCKS NATIONAL LAKESHORE

Rte. No.	Cycle Collected	FMSS No.	Concess Route	Route Name	Route Description From To	Maint. District	Paved Miles	Un-Paved Miles	Total Route Length	Func. Class	Manual Rated SQ/FT	Surf. Type	Area Maps
0010	5	29607		SAND POINT ROAD	FROM END OF WASHINGTON STREET (NON NPS) AT PARK BOUNDARY SIGN TO END OF LOOP	N/A	1.15	0.00	1.15	1		AS	1
0011	5	29881		MINERS CASTLE ROAD	FROM END OF COUNTY ROAD H11 AT PAVEMENT CHANGE TO ROUTE 0905 (MINERS CASTLE PARKING)	N/A	2.01	0.00	2.01	1		AS	2
0012	5	29883		MINERS BEACH ROAD	FROM ROUTE 0011 (MINERS CASTLE ROAD) TO ROUTE 0910 (MINERS BEACH PARKING) AT MP 1.18	N/A	0.43	0.75	1.18	2		AS	2
0013	NC	29882		MINERS FALLS ROAD	FROM ROUTE 0011 (MINERS CASTLE ROAD) TO ROUTE 0911 (MINERS FALLS PARKING)	N/A	0.00	0.48	0.48	2		GR	
0014	NC	29929		CHAPEL ROAD	FROM PARK BOUNDARY TO ROUTE 0912 (CHAPEL PARKING)	N/A	0.00	0.18	0.18	2		GR	
0015	NC	29966		LITTLE BEAVER ROAD	FROM PARK BOUNDARY TO ROUTE 0929 (LITTLE BEAVER CAMPGROUND PARKING)	N/A	0.00	3.00	3.00	2		GR	
0016	NC	30044		TWELVEMILE BEACH ROAD	FROM PARK BOUNDARY TO ROUTE 0914 (12 MILE PICNIC AREA PARKING)	N/A	0.00	1.50	1.50	2		GR	
0017	NC	30074		HURRICANE RIVER ROAD	FROM PARK BOUNDARY TO ROUTE 0915 (HURRICANE RIVER DAY USE PARKING)	N/A	0.00	0.42	0.42	2		GR	
0018	5	30157		LOG SLIDE ROAD	FROM ROUTE 5000 (COUNTY ROAD H-58) / PARK BOUNDARY TO ROUTE 0916 (LOG SLIDE PARKING)	N/A	0.67	0.00	0.67	2		AS	3
0101	NC	30082		HR HURRICANE UPPER CAMPGROUND ROAD	FROM ROUTE 5000 (COUNTY ROAD H-58) TO END	N/A	0.00	0.30	0.30	2		GR	
0205	NC	29884		MINERS BEACH ROAD EAST	FROM ROUTE 0012 (MINERS BEACH ROAD) TO ROUTE 0930 (MINER BEACH EAST PARKING)	N/A	0.00	0.30	0.30	2		GR	
0206	NC	93349		BUCK HILL SERVICE ROAD	FROM ROUTE 5000 (COUNTY ROAD H-58) TO RADIO TOWER	N/A	0.00	0.19	0.19	6		GR	
0400	NC	30035		BEAVER BASIN ROAD	FROM PARK BOUNDARY TO END	N/A	0.00	2.88	2.88	2		GR	
0401	NC	30126		AU SABLE LIGHT STATION ROAD	FROM ROUTE 0017 (HURRICANE RIVER ROAD) TO END	N/A	0.00	1.38	1.38	5		GR	
0402	NC	30185		GRAND SABLE LAKE SEASONAL ROAD	FROM COUNTY ROAD 772 TO END	N/A	0.00	0.54	0.54	6		GR	

Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 04/10/2013

(Numerical By Route #)

Page 2 of 6

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= Concession Route Flag ON

Green = All Unpaved Parking Areas

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PIRO

PICTURED ROCKS NATIONAL LAKESHORE

Rte. No.	Cycle Collected	FMSS No.	Concess Route	Route Name	Route Description From To	Maint. District	Paved Miles	Un-Paved Miles	Total Route Length	Func. Class	Manual Rated SQ/FT	Surf. Type	Area Maps
0403	NC	30342		GRAND MARAIS MAINTENANCE / RESIDENCE ACCESS	FROM ROUTE 5000 (COUNTY ROAD H-58) TO END OF LOOP	N/A	0.00	0.15	0.15	5		GR	
0900	5	29750		MUNISING FALLS PARKING	FROM WASHINGTON STREET TO PARKING	N/A	0.00	0.00	0.00		39,779	AS	1
0901ZZ	5	29608		SAND POINT BEACH PARKING AREAS	ADJACENT TO ROUTE 0010 (SAND POINT ROAD)	N/A	0.00	0.00	0.00		13,196	AS	1
0902B	NC	29832		MUNISING SKI TRAIL PARKING	FROM ROUTE 0903A (MUNISING MAINTENANCE SHOP A) TO PARKING	N/A	0.00	0.00	0.00		10,500	GR	
0903A	5	29824		MUNISING MAINTENANCE SHOP A	FROM ROUTE 5000 (COUNTY ROAD H-58) TO PARKING	N/A	0.00	0.00	0.00		23,076	AS	1
0903B	NC	102193		MUNISING MAINTENANCE SHOP B	FROM ROUTE 0903A (MUNISING MAINTENANCE SHOP A) TO PARKING	N/A	0.00	0.00	0.00		15,000	GR	
0905	5	29919		MINERS CASTLE PARKING	FROM END OF ROUTE 0011 (MINERS CASTLE ROAD) TO PARKING	N/A	0.00	0.00	0.00		82,182	AS	2
0906	5	30190		GRAND SABLE VISITOR CENTER PARKING	FROM ROUTE 5000 (COUNTY ROAD H-58) TO ROUTE 5000 (COUNTY ROAD H-58)	N/A	0.00	0.00	0.00		12,155	AS	4
0907	5	102146		GRAND SABLE TRAILHEAD PARKING	FROM ROUTE 5000 (COUNTY ROAD H-58) TO ROUTE 5000 (COUNTY ROAD H-58)	N/A	0.00	0.00	0.00		15,213	AS	4
0908	5	30332		SABLE FALLS PARKING	FROM ROUTE 5000 (COUNTY ROAD H-58) TO PARKING	N/A	0.00	0.00	0.00		57,286	AS	4
0909	NC	29609		SAND POINT HEADQUARTERS PARKING	FROM ROUTE 0010 (SAND POINT ROAD) TO ROUTE 0010 (SAND POINT ROAD)	N/A	0.00	0.00	0.00		15,000	GR	
0910	NC	29920		MINERS BEACH PARKING	FROM END OF ROUTE 0012 (MINERS BEACH ROAD) TO PARKING	N/A	0.00	0.00	0.00		19,100	GR	
0911	NC	29916		MINERS FALLS PARKING	FROM END OF ROUTE 0013 (MINERS FALLS ROAD) TO PARKING	N/A	0.00	0.00	0.00		17,300	GR	
0912	NC	29931		CHAPEL PARKING	FROM END OF ROUTE 0014 (CHAPEL ROAD) TO PARKING	N/A	0.00	0.00	0.00		15,600	GR	
0913	NC	59658		LITTLE BEAVER BACKPACK PARKING	FROM ROUTE 0015 (LITTLE BEAVER ROAD) TO PARKING	N/A	0.00	0.00	0.00		6,000	GR	

Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 04/10/2013

(Numerical By Route #)

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PIRO

PICTURED ROCKS NATIONAL LAKESHORE

Rte. No.	Cycle Collected	FMSS No.	Concess Route	Route Name	Route Description From To	Maint. District	Paved Miles	Un-Paved Miles	Total Route Length	Func. Class	Manual Rated SQ/FT	Surf. Type	Area Maps
0914	NC	30045		12 MILE PICNIC AREA PARKING	FROM ROUTE 0016 (TWELVEMILE BEACH ROAD) TO PARKING	N/A	0.00	0.00	0.00		10,150	GR	
0915	NC	30077		HURRICANE RIVER DAY USE PARKING	FROM ROUTE 0017 (HURRICANE RIVER ROAD) TO PARKING	N/A	0.00	0.00	0.00		9,250	GR	
0916	5	30158		LOG SLIDE PARKING	FROM END OF ROUTE 0018 (LOG SLIDE ROAD) TO PARKING	N/A	0.00	0.00	0.00		33,141	AS	3
0917	NC	55044		GRAND SABLE OVERLOOK	FROM ROUTE 5000 (COUNTY ROAD H-58) TO ROUTE 5000 (COUNTY ROAD H-58)	N/A	0.00	0.00	0.00		5,950	GR	
0918	NC	30188		GRAND SABLE DUNES PARKING	FROM ROUTE 0919 (GRAND SABLE BOAT LAUNCH PARKING) TO PARKING	N/A	0.00	0.00	0.00		17,100	GR	
0919	NC	30191		GRAND SABLE BOAT LAUNCH PARKING	FROM COUNTY ROAD 772 TO PARKING	N/A	0.00	0.00	0.00		2,800	GR	
0922	NC	30036		BEAVER BASIN OVERLOOK PARKING	FROM ROUTE 0400 (BEAVER BASIN ROAD) TO PARKING	N/A	0.00	0.00	0.00		3,000	GR	
0923	NC	59656		GRAND MARAIS MAINTENANCE/RESIDENCE PARKING	FROM ROUTE 0403 (GRAND MARAIS MAINTENANCE / RESIDENCE ACCESS) TO PARKING	N/A	0.00	0.00	0.00		10,000	GR	
0926	NC	30487		GRAND MARAIS RANGER STATION PARKING	ADJACENT TO COAST GUARD POINT ROAD	N/A	0.00	0.00	0.00		1,476	GR	
0927	NC	30486		GRAND MARAIS BREAKWALL PARKING	ADJACENT TO COAST GUARD POINT ROAD	N/A	0.00	0.00	0.00		31,780	GR	
0928	5	30075		HURRICANE RIVER BRIDGE PARKING	FROM ROUTE 0017 (HURRICANE RIVER ROAD) TO PARKING	N/A	0.00	0.00	0.00		5,803	AS	3
0929	NC	29972		LITTLE BEAVER CAMPGROUND PARKING	ADJACENT TO ROUTE 0015 (LITTLE BEAVER ROAD)	N/A	0.00	0.00	0.00		2,800	GR	
0930	NC	29924		MINER BEACH EAST PARKING	FROM END OF ROUTE 0205 (MINERS BEACH ROAD EAST) TO PARKING	N/A	0.00	0.00	0.00		7,200	GR	
0931	NC	29833		MUNISING E. CITY SKI TRAIL PARKING	ADJACENT TO EAST CITY LIMITS ROAD	N/A	0.00	0.00	0.00		10,500	GR	
0932	5	29805		MUNISING RANGE LIGHT PARKING	FROM WEST MUNISING AVENUE TO PARKING	N/A	0.00	0.00	0.00		1,780	AS	1

Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 04/10/2013

(Numerical By Route #)

Page 5 of 6

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CYCLE 5 SUMMARY TOTALS FOR PICTURED ROCKS NATIONAL LAKESHORE

CYCLE 5 ROUTE TOTALS

DCV Driven Route Miles	4.25
Manually Rated Route Miles	0.00
TOTAL PARK ROUTE MILES COLLECTED IN CYCLE 5	4.25
Manually Rated Routes (SQFT)	0
TOTAL UNPAVED PARK ROUTE MILES	12.07

CYCLE 5 CONCESSION TOTALS

Concession Paved Route Miles	0.00
Concession Unpaved Route Miles	0.00
TOTAL CONCESSION ROUTE MILES	0.00
Concession Paved Parking Area SQFT	0
Concession Unpaved Parking Area SQFT	0
TOTAL CONCESSION PARKING AREA SQFT	0
Concession Manually Rated Routes SQFT	0

* CYCLE 5 PARKING AREA TOTALS

Paved Parking (SQFT)	306,269
Unpaved Parking (SQFT)	210,506
TOTAL PARKING (SQFT)	516,775

CYCLE 5 WEIGHTED AVERAGE PARK VALUES

DCV Driven PCR	89
**Manually Rated Routes PCR	N/A
**Parking PCR	77
***Total Equivalent Lane Miles	14.14

* - The Parking Area Totals SQFT value represents all parking areas collected in Cycle 5, both park and concessionaire.

** - Parking and Manually Rated Routes are assigned the following PCR values based on their observed condition: Construction=-1, Excellent=97, Good=90, Fair=73, and Poor=45.

*** - Equivalent Lane Miles are calculated by route using the following equations : DCV and Manually Rated Lines Routes=(PAVE_WIDTHxPAVED_MI)/11 foot lane. Parking Areas=SQ_FEET/5280/11. Manually Rated Polygons=SQ_FEET/5280/11.

Cycle 5 NPS/RIP Route ID Report

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General Park Road Functional Classification Table

- Class 1** Principal Park Road/Rural Parkway (Public Roads) Roads which constitute the main access route, circulatory tour, or thoroughfare for park visitors. Route Numbers 1 - 99. Note: Rural parkways (e.g. Natchez Trace) are numbered 1 - 9. State Routes Inventoried for Park. Route Numbers 5000-5999
- Class 2** Connector Park Road (Public Roads) - Roads which provide access within a park to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, etc. Route Numbers 100-199.
- Class 3** Special Purpose Park Road (Public Roads) - 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. Route Numbers 200-299.
- Class 4** Primitive Park Roads (Public Roads) - 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. Route Numbers 200-299. Note: Functional Classes 3 and 4 have the same route numbers because, historically, they were numbered similarly.
- Class 5** Administrative Access Road (Administrative Roads) - All public roads intended for access to administrative developments or structures such as park offices, employee quarters, or utility areas. Route Numbers 400-499.
- Class 6** Restricted Road (Administrative Roads) - All roads normally closed to the public, including patrol roads, truck trails, and other similar roads. Route Numbers 400-499. 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.
- Class 7** Urban Parkway (Urban Parkways and City Streets) - 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. Route Numbers 1-9.
- Class 8** City Streets (Urban Parkways and City Streets) - 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. Route Numbers 600-699.

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 number 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.

5000 route numbers are assigned to Non-NPS Routes that are State, County or City owned which border, traverse, or provide access to Park Facilities or Locations. 5000 Routes are driven for GPS and Video Log only.

Surface Type Abbreviations:

- AS - Asphaltic Concrete Pavement**
- CO - Portland Cement Concrete Pavement**
- BR - Brick or Pavers Road Bed**
- CB - Cobble Stone Road Bed**
- GR - Gravel Road Bed**
- SA - Sand Road Bed**
- NV - Native or Dirt Material Road Bed**
- OT - Other Materials Road Bed**

NPS/RIP Subcomponent Details for PIRO

Road Inventory Program 04/10/2013

(Numerical By Subcomponent #)

Page 1 of 1

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PIRO

PICTURED ROCKS NATIONAL LAKESHORE

Rte. No.	FMSS No.	Cycle Collected	Route Name	From	To	Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
0901ZZ	29608	5	SAND POINT BEACH PARKING AREAS	ADJACENT TO ROUTE 0010 (SAND POINT ROAD)				0.00	0.00	0.00	13,196

PIRO-0901ZZ Subcomponent Breakdown

Rte. No.	FMSS No.	Cycle Collected	Route Name	From	To	Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
0901Z	29608	5	SAND POINT BEACH PARKING A	ADJACENT TO ROUTE 0010 (SAND POINT ROAD) ON LEFT				0.00	0.00	0.00	8,902
0925Z	29608	5	SAND POINT BEACH PARKING B	ADJACENT TO ROUTE 0010 (SAND POINT ROAD) ON RIGHT				0.00	0.00	0.00	4,294

ROUTE IDENTIFICATION CHANGES TO PAVED ROUTES FROM PREVIOUS CYCLE - PIRO

ROUTES ADDED FROM PREVIOUS INVENTORY:			
Route #	Route Name	Reason for Addition	Comments
0928	HURRICAINA RIVER BRIDGE PARKING	RECENTLY CONSTRUCTED ROUTE	NEW PARKING AREA CONSTRUCTED AND ADDED TO THE INVENTORY.
0932	MUNISING RANGE LIGHT PARKING	OTHER	PARKING AREA ACQUIRED BY THE PARK AND ADDED TO THE INVENTORY.
0933	LAKE SUPERIOR OVERLOOK PARKING	RECENTLY CONSTRUCTED ROUTE	NEW PARKING AREA CONSTRUCTED AND ADDED TO THE INVENTORY.
5000	COUNTY ROAD H-58	OTHER	ROUTE ADDED TO THE INVENTORY IN CYCLE 5.
ROUTES MODIFIED FROM PREVIOUS INVENTORY:			
Route #	Route Name	Type of Modification	Comments
0012	MINERS BEACH ROAD	SURFACE TYPE CHANGE	A PORTION OF ROUTE 0012 WAS PAVED AND COLLECTED IN CYCLE 5. THE ENTIRE ROUTE WAS UNPAVED IN CYCLE 3.
0018	LOG SLIDE ROAD	SURFACE TYPE CHANGE	ROUTE 0018 WAS PAVED AND COLLECTED IN CYCLE 5. THE ENTIRE ROUTE WAS UNPAVED IN CYCLE 3.
0916	LOG SLIDE PARKING	SURFACE TYPE CHANGE	ROUTE 0916 WAS PAVED AND COLLECTED IN CYCLE 5. THE PARKING AREA WAS UNPAVED IN CYCLE 3.

ROUTE IDENTIFICATION CHANGES TO PAVED ROUTES FROM PREVIOUS CYCLE - PIRO

OTHER CHANGES FROM PREVIOUS INVENTORY:			
Route #	Route Name	Type of Change	Comments
0900	MUNISING FALLS PARKING	SQ FEET CHANGE	GPS UPDATED IN CYCLE 5 TO SHOW PARKING LOT SHAPE ACCURATELY.
0901ZZ	SAND POINT BEACH PARKING AREAS	ROUTES COMBINED	CYCLE 3 ROUTES 0901 AND 0925 WERE COMBINED.
0903A	MUNISING MAINTENANCE SHOP A	ROUTES COMBINED	CYCLE 3 ROUTE 0902A WAS COMBINED INTO CYCLE 5 ROUTE 0903A.

Section 3

Park Summary Information



Pictured Rocks National Lakeshore



Federal Lands Highway
Road Inventory Program

PIRO: PAVED ROUTE MILES AND PERCENTAGES BY FUNCTIONAL CLASS AND PCR

F.C.	Pavement Condition Rating (PCR)								TOTAL MILES
	Poor (0-60)		Fair (61-84)		Good (85-94)		Excellent (95-100)		
	MILES	%	MILES	%	MILES	%	MILES	%	
1	0.02	0.46%	1.32	30.56%	1.70	39.35%	0.12	2.78%	3.16
2	0.06	1.39%	0.02	0.46%	0.17	3.94%	0.91	21.06%	1.16
3									
4									
5									
6									
7									
8									
Totals	0.08	1.85%	1.34	31.02%	1.87	43.29%	1.03	23.84%	4.32

Note: The information in this table is derived from the PMS_20 table in the Park database, which only contains processed data from routes collected with the Data Collection Vehicle (DCV). Information for Manually Rated Routes (MRR) and Parking Areas is not reported in this table. Only Functional Class 1, 2, & 7 routes, and any new routes not previously collected by RIP, are collected in Large Parks.

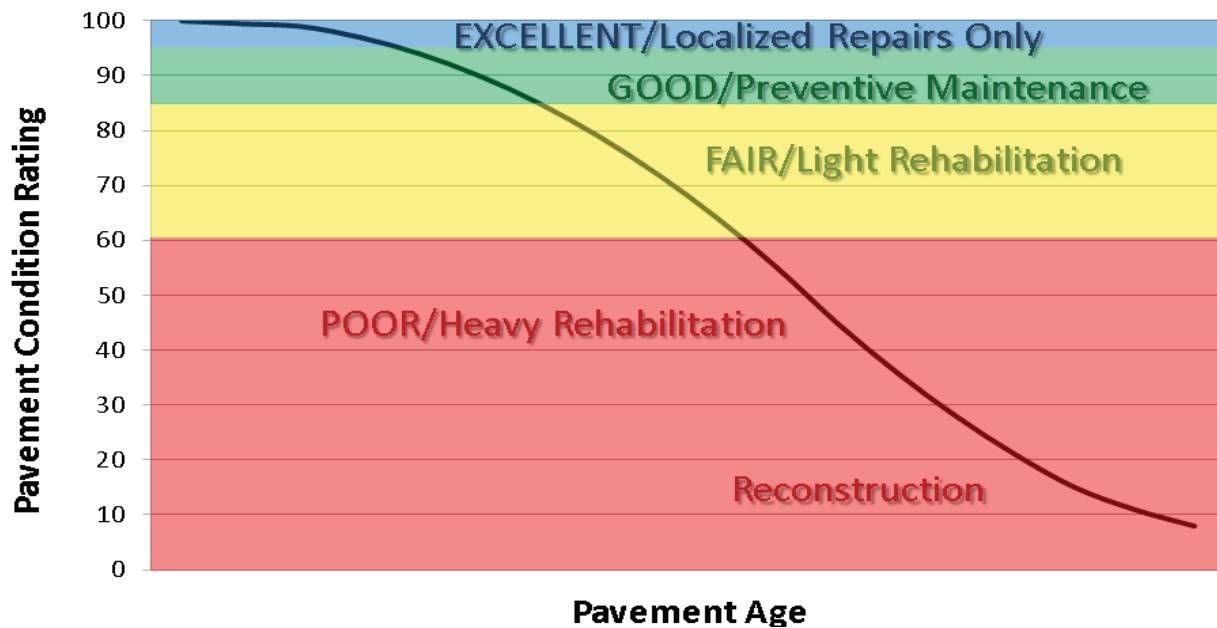
Explanation of the Excellent, Good, Fair and Poor Condition Descriptions

In addition to the RIP Index changes that have been implemented in Cycle 5, we will also aim to provide greater assistance in translating excellent/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 0-60. 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 Pavement Management System's data from our Highway Pavement Management Application (HPMA) please contact the Eastern Federal Lands pavement team.

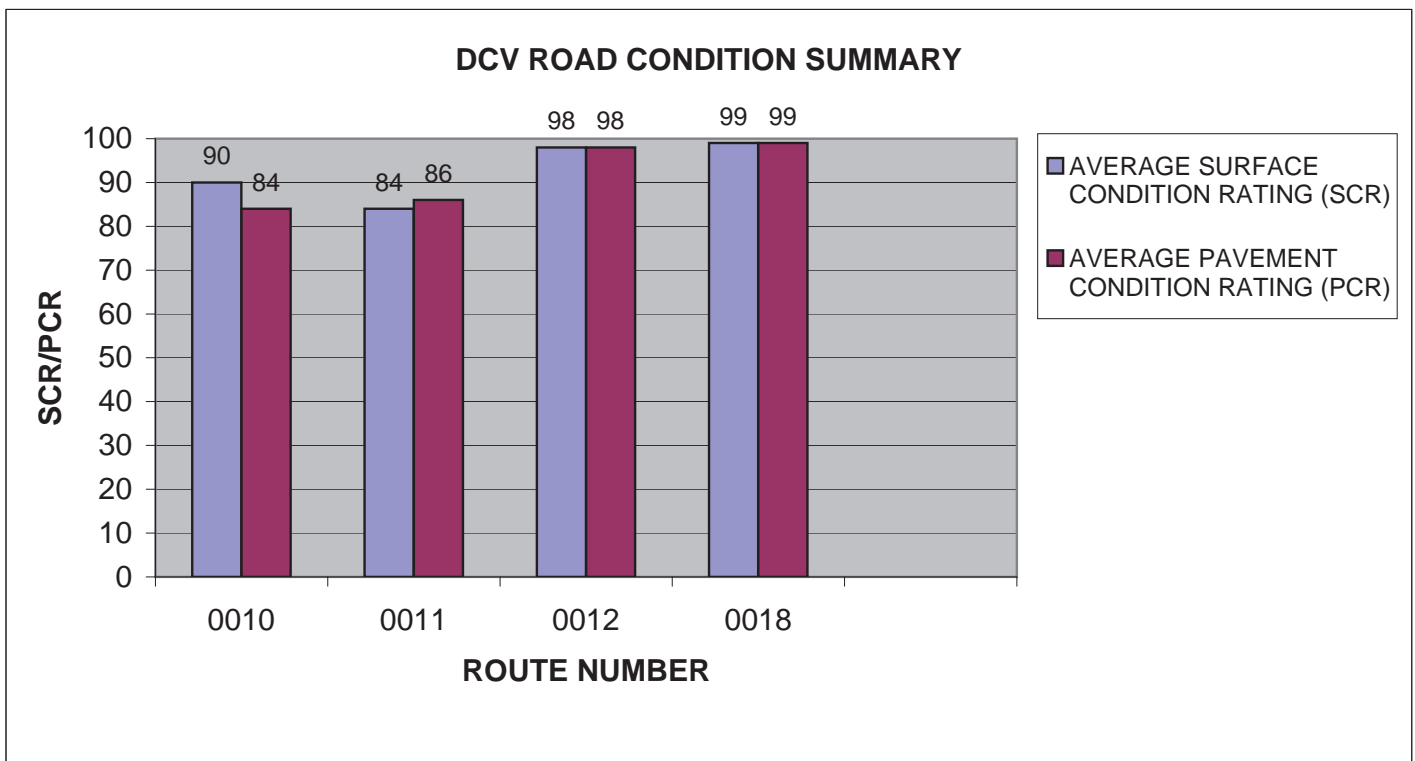
Condition Categories and Treatments



PIRO: DCV ROAD CONDITION SUMMARY

DCV - Data Collection Vehicle

ROUTE NUMBER	ROUTE NAME	FUNCT CLASS	PAVED LENGTH	SURFACE TYPE	AVERAGE SURFACE CONDITION RATING (SCR)	AVERAGE PAVEMENT CONDITION RATING (PCR)
0010	SAND POINT ROAD	1	1.15	ASPHALT	90	84
0011	MINERS CASTLE ROAD	1	2.01	ASPHALT	84	86
0012	MINERS BEACH ROAD	2	0.43	ASPHALT	98	98
0018	LOG SLIDE ROAD	2	0.67	ASPHALT	99	99

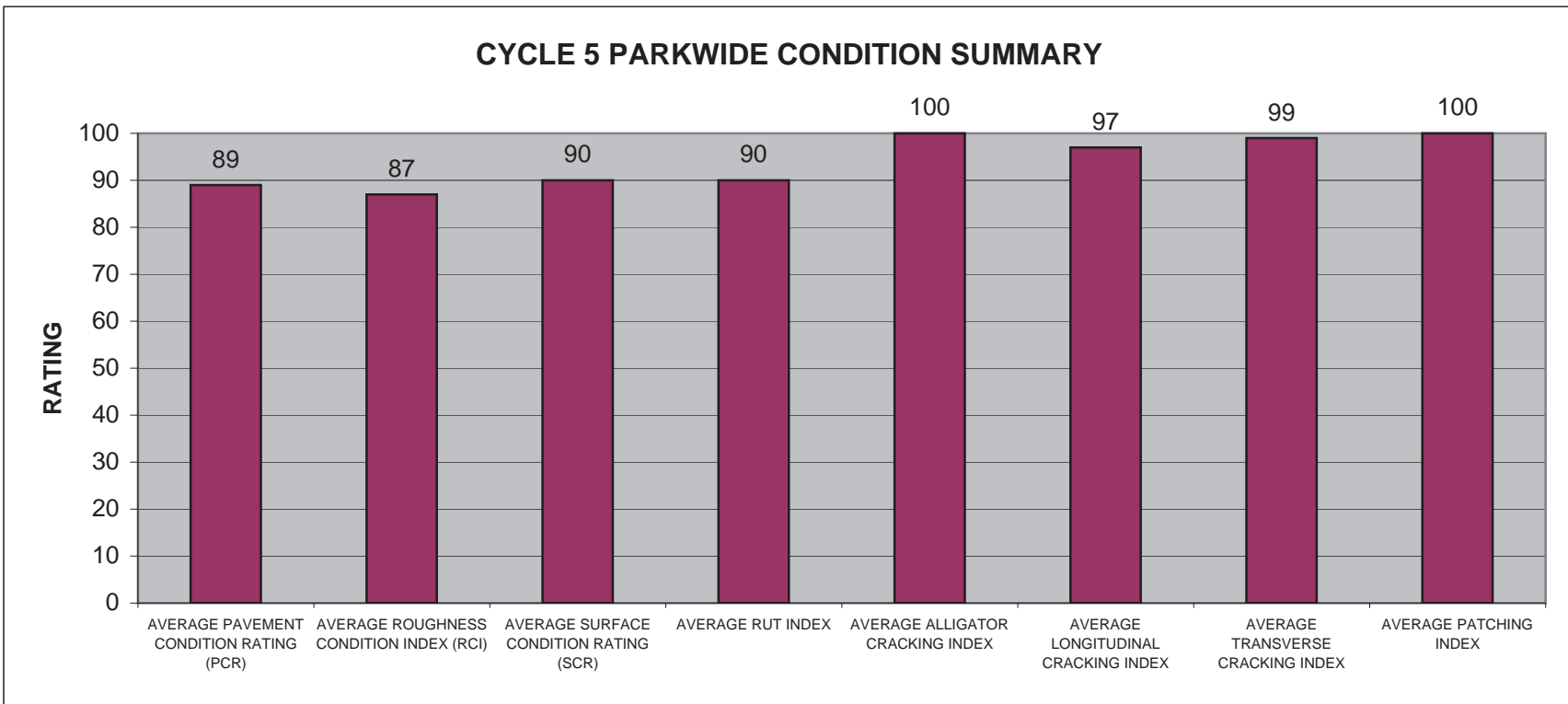


PIRO: PARKWIDE DCV CONDITION SUMMARY

AVERAGE PAVEMENT CONDITION RATING (PCR)	AVERAGE ROUGHNESS CONDITION INDEX (RCI)	AVERAGE SURFACE CONDITION RATING (SCR)	AVERAGE RUT INDEX	AVERAGE ALLIGATOR CRACKING INDEX	AVERAGE LONGITUDINAL CRACKING INDEX	AVERAGE TRANSVERSE CRACKING INDEX	AVERAGE PATCHING INDEX
89	87	90	90	100	97	99	100

All Index values are based on Data Collection Vehicle (DCV) driven roads that were collected in Cycle-5.

Roughness data is only collected on routes with lengths greater than 0.5 miles and a posted speed limit of 25 MPH or greater.



Section 4

Park Route Location Maps

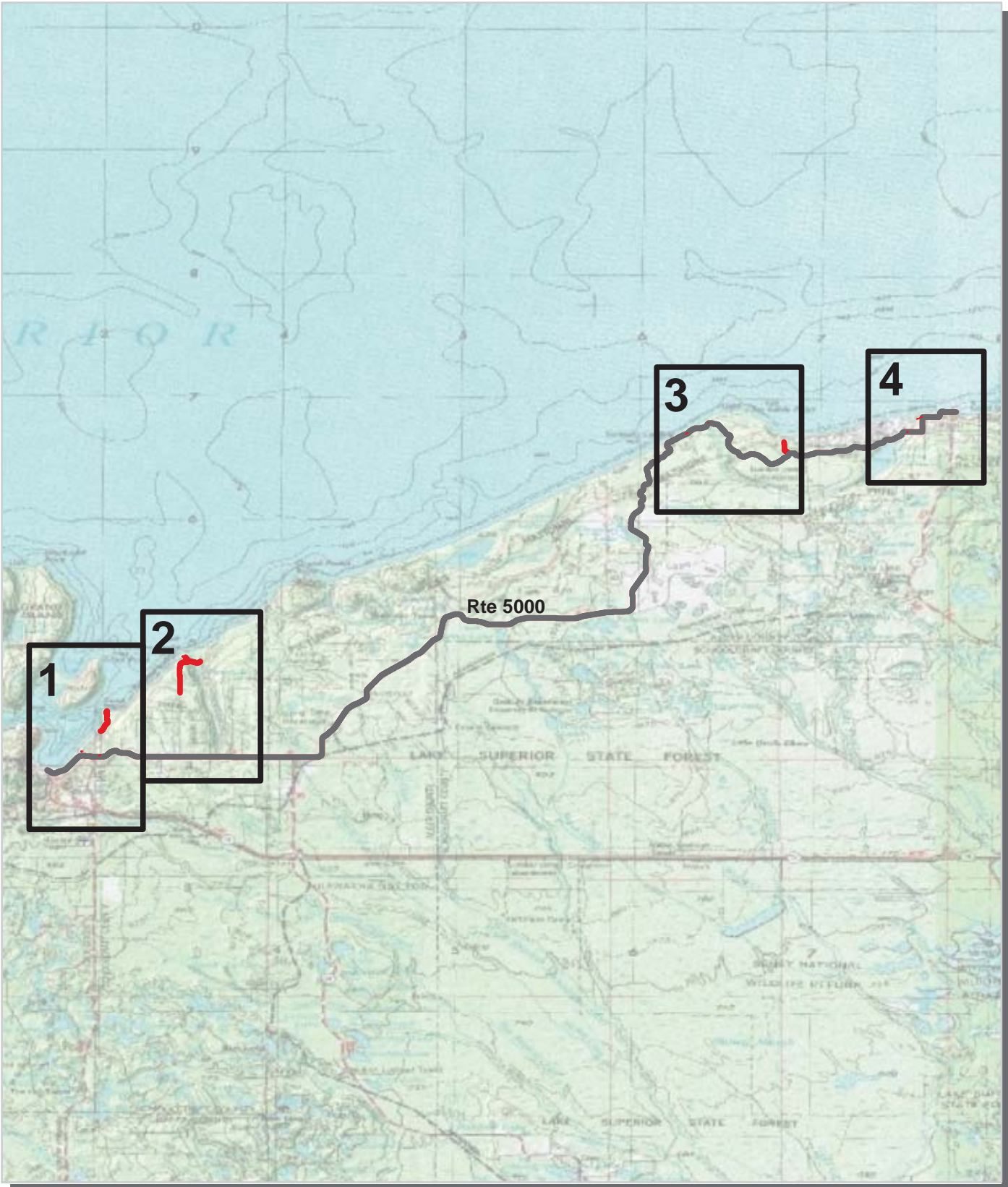


Pictured Rocks National Lakeshore



Federal Lands Highway
Road Inventory Program

Pictured Rocks National Lakeshore
Route Location Map
Key Map



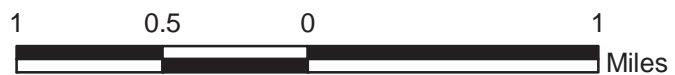
 Cycle 5 Collected Routes



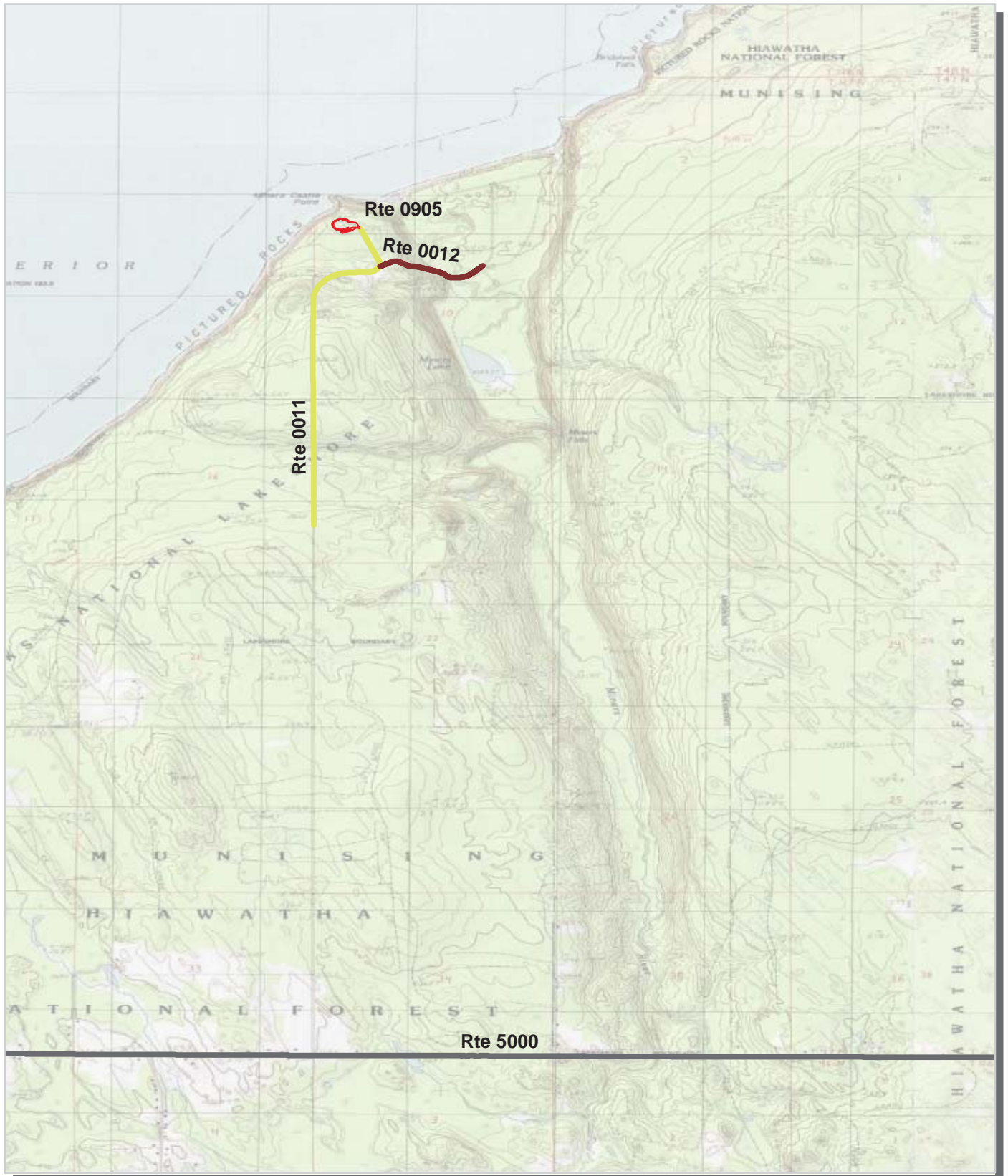
Pictured Rocks National Lakeshore Route Location Map Area 1



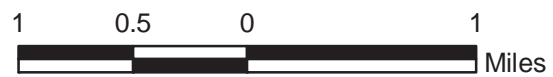
Unique colors used to differentiate routes



Pictured Rocks National Lakeshore Route Location Map Area 2



Unique colors used to differentiate routes



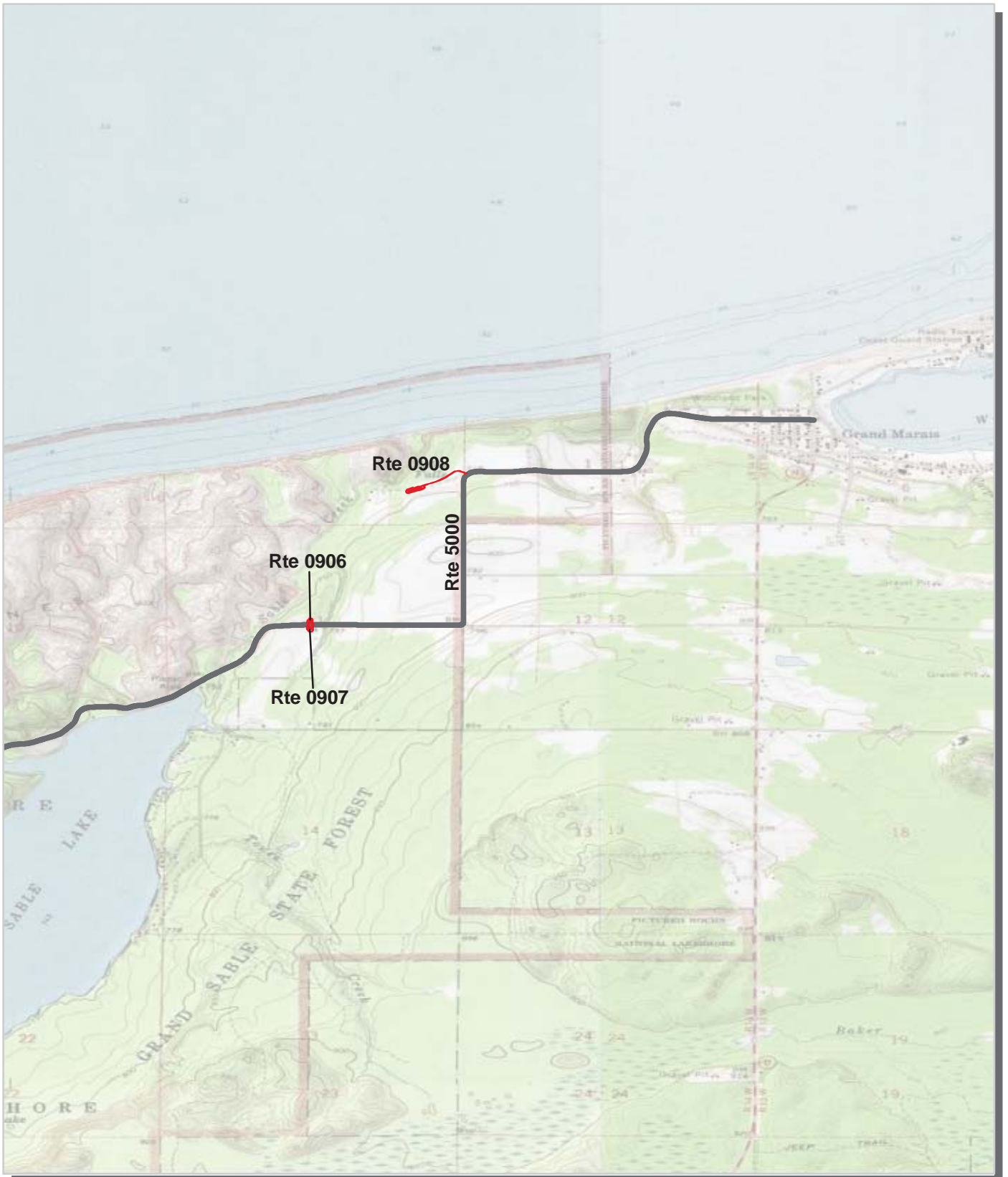
Pictured Rocks National Lakeshore
Route Location Map
Area 3



Unique colors used to differentiate routes



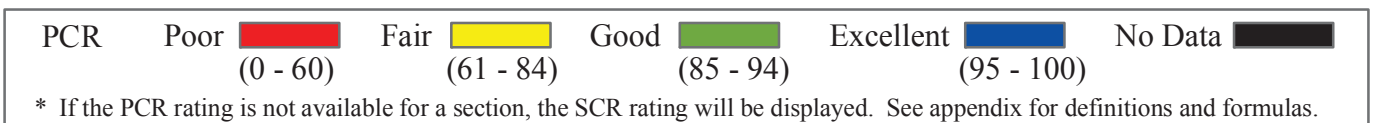
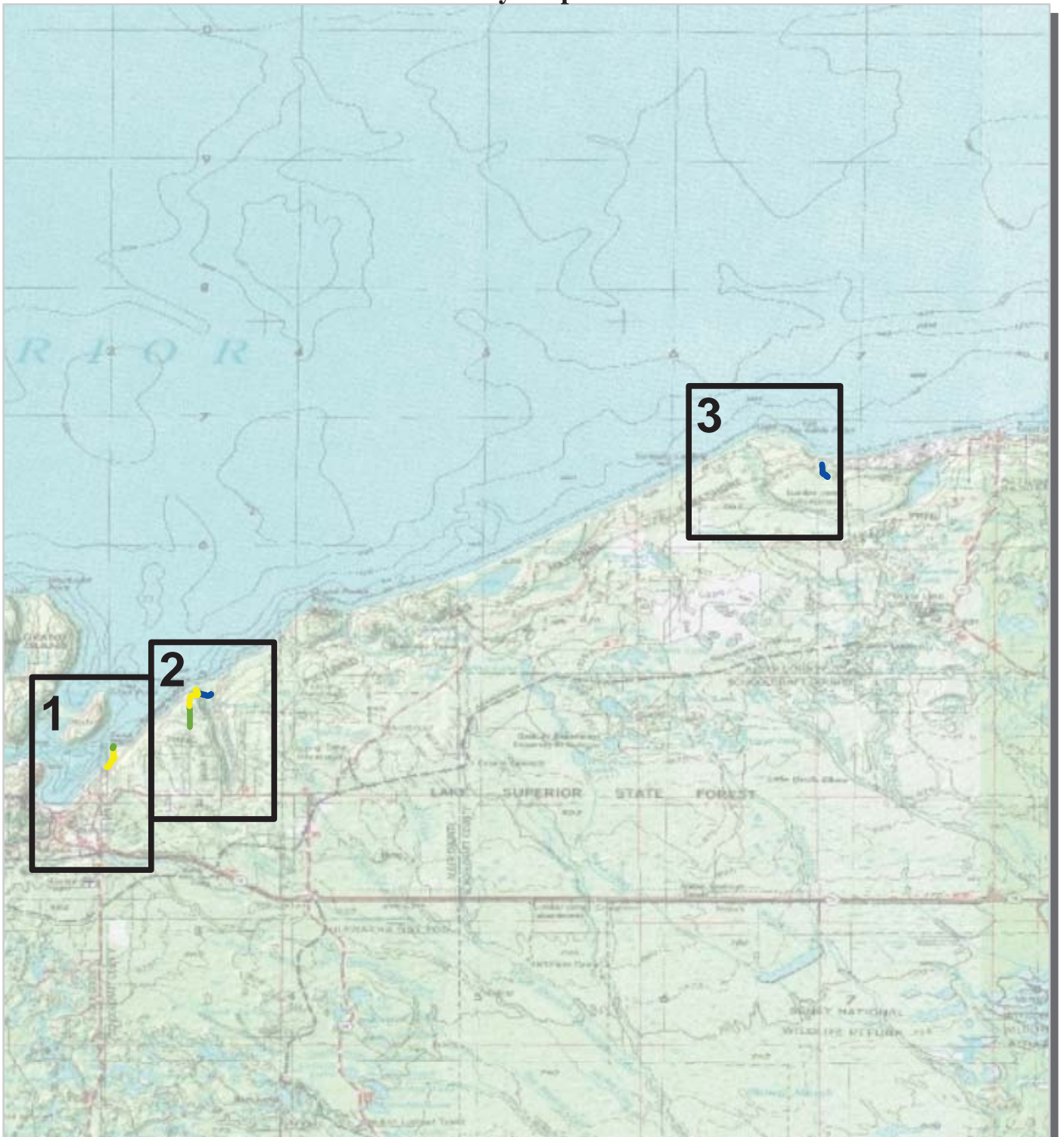
Pictured Rocks National Lakeshore Route Location Map Area 4



Unique colors used to differentiate routes



**Pictured Rocks National Lakeshore
Route Condition Map
PCR - Mile by Mile
Key Map**



Note: Only routes collected by the DCV in Cycle-5 are displayed.



Pictured Rocks National Lakeshore Route Condition Map PCR - Mile by Mile Area 1

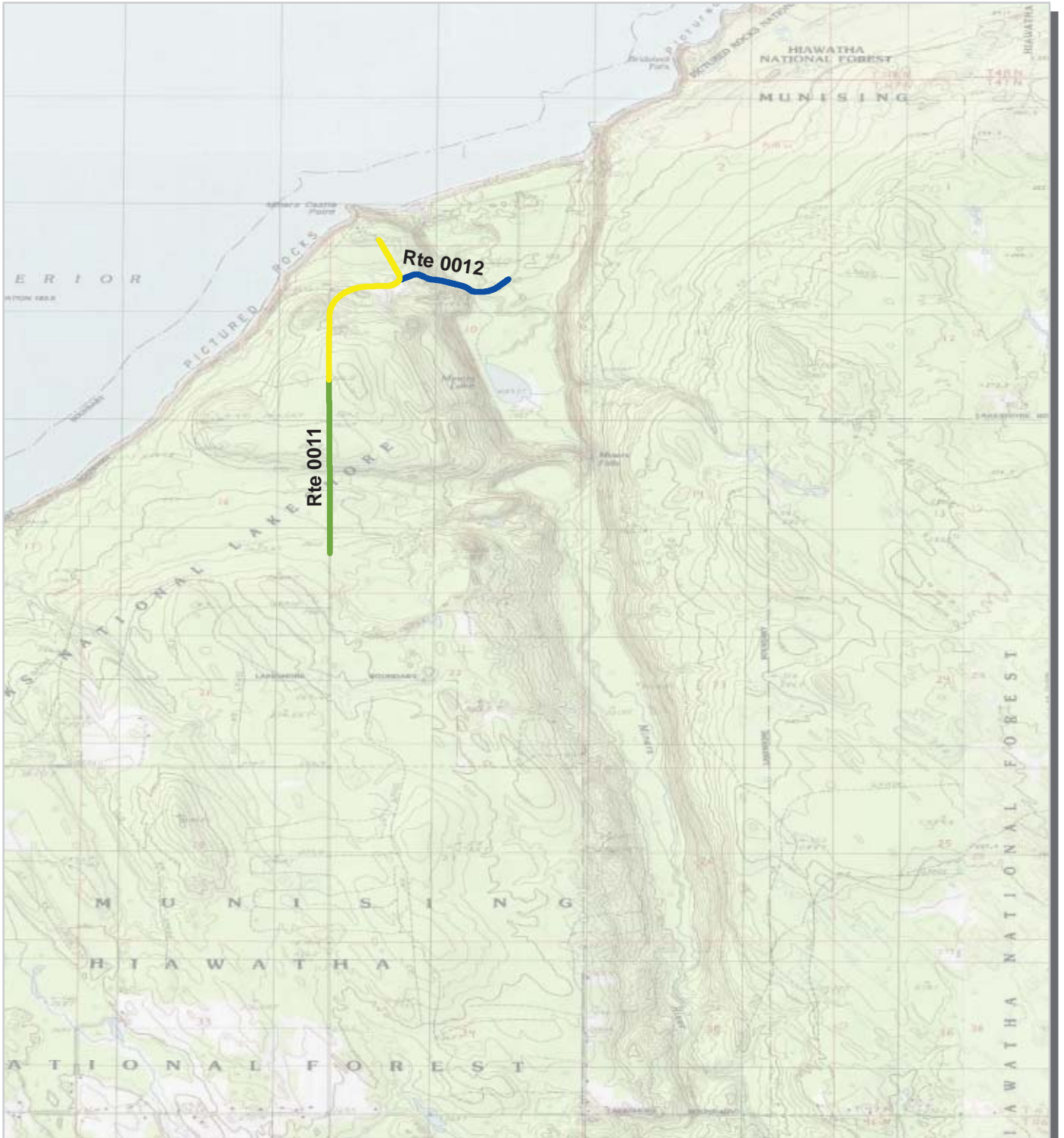


PCR	Poor		Fair		Good		Excellent		No Data	
	(0 - 60)		(61 - 84)	(85 - 94)		(95 - 100)				

* If the PCR rating is not available for a section, the SCR rating will be displayed. See appendix for definitions and formulas.



Pictured Rocks National Lakeshore Route Condition Map PCR - Mile by Mile Area 2



PCR	Poor		Fair		Good		Excellent		No Data	
	(0 - 60)		(61 - 84)	(85 - 94)		(95 - 100)				

* If the PCR rating is not available for a section, the SCR rating will be displayed. See appendix for definitions and formulas.



**Pictured Rocks National Lakeshore
Route Condition Map
PCR - Mile by Mile
Area 3**



PCR	Poor	Fair	Good	Excellent	No Data
	(0 - 60)	(61 - 84)	(85 - 94)	(95 - 100)	

* If the PCR rating is not available for a section, the SCR rating will be displayed. See appendix for definitions and formulas.



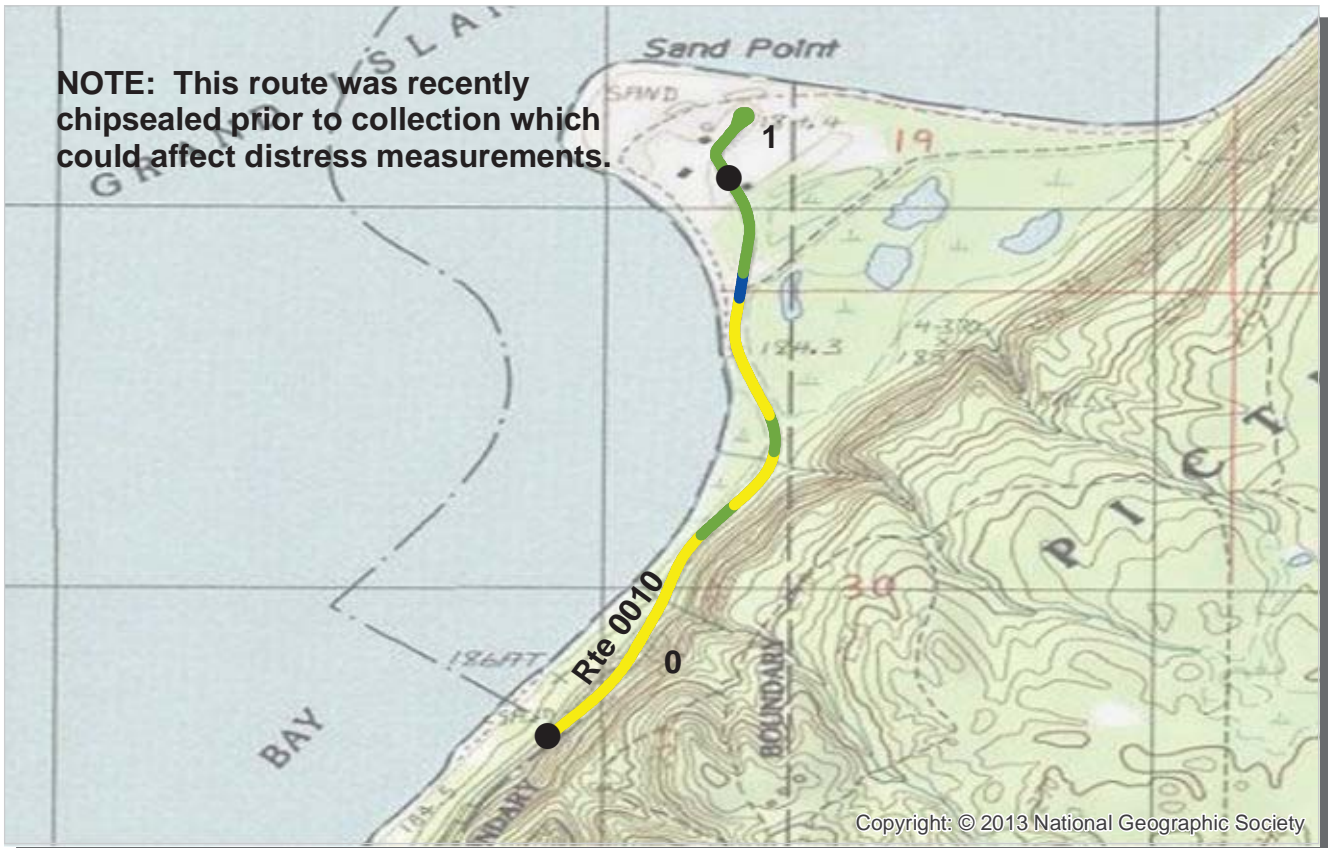
Section 5
Paved Route
Condition Rating Sheets



Pictured Rocks National Lakeshore



**Federal Lands Highway
Road Inventory Program**



PCR Poor ■ Fair ■ Good ■ Excellent ■ No Data ■
 (0 - 60) (61 - 84) (85 - 94) (95 - 100)

* If the PCR rating is not available for a section, the SCR rating will be displayed. See appendix for definitions and formulas.

ROUTE: 0010 SAND POINT ROAD
PIRO : PICTURED ROCKS NATIONAL LAKESHORE

COLLECTED: 9/15/2012
TOTAL LENGTH: 1.15 Miles

MIDWEST REGION

<i>Section Number</i>	0	1			
<i>Section Length (mi)</i>	1.00	0.15			
<i>Cross Section Information</i>					
Number of Lanes	2	2			
Paved Width (ft)	22	23			
Lane Width (ft)	11	11			
<i>Roadway Condition Information</i>					
SCR (Surface Condition Rating)	90	90			
PCR (Pavement Condition Rating)	83	91			
<i>Distress Index Values</i>					
Structural Crack Index	91	90			
Transverse Cracking Index	97	97			
Patching Index	100	100			
Rutting Index	90	95			
Roughness Condition Index (RCI)	72	93			

NOTES:

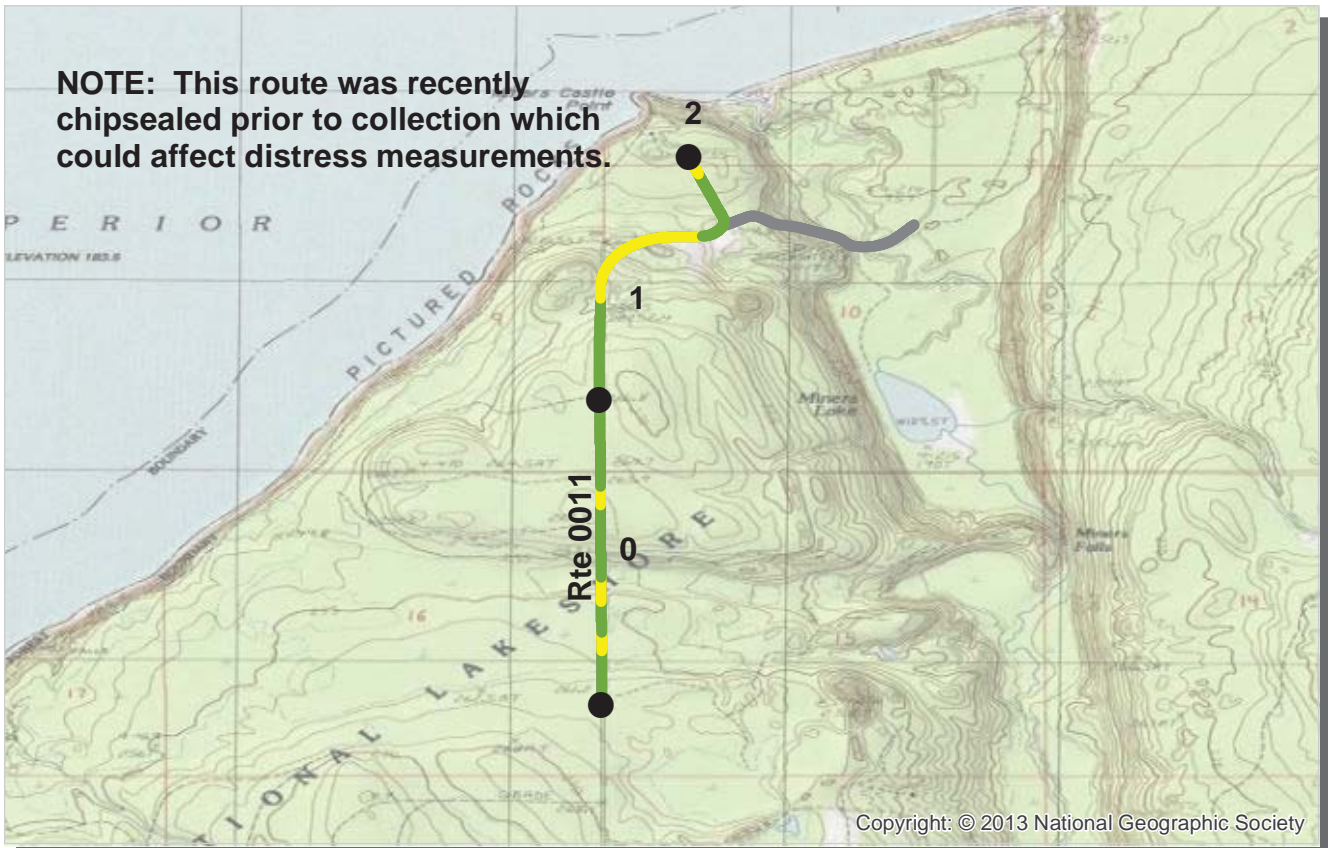
Structural Crack Index is a combination of the Longitudinal Cracking Index and Alligator Cracking Index.

See Section 10 for explanation of SCR, PCR, & all Distress Index Values.

NC - Not Collected N/A - Not Applicable



ROUTE: 0010 SAND POINT ROAD



PCR Poor ■ Fair ■ Good ■ Excellent ■ No Data ■
 (0 - 60) (61 - 84) (85 - 94) (95 - 100)

* If the PCR rating is not available for a section, the SCR rating will be displayed. See appendix for definitions and formulas.

ROUTE: 0011 MINERS CASTLE ROAD
PIRO : PICTURED ROCKS NATIONAL LAKESHORE

COLLECTED: 9/15/2012
TOTAL LENGTH: 2.01 Miles

MIDWEST REGION

<i>Section Number</i>	0	1	2		
<i>Section Length (mi)</i>	1.00	1.00	0.01		
<i>Cross Section Information</i>					
Number of Lanes	2	2	2		
Paved Width (ft)	24	24	24		
Lane Width (ft)	12	12	12		
<i>Roadway Condition Information</i>					
SCR (Surface Condition Rating)	85	83	91		
PCR (Pavement Condition Rating)	89	83	80		
<i>Distress Index Values</i>					
Structural Crack Index	99	100	94		
Transverse Cracking Index	100	100	100		
Patching Index	100	100	100		
Rutting Index	85	83	91		
Roughness Condition Index (RCI)	95	84	64		

NOTES:

Structural Crack Index is a combination of the Longitudinal Cracking Index and Alligator Cracking Index.

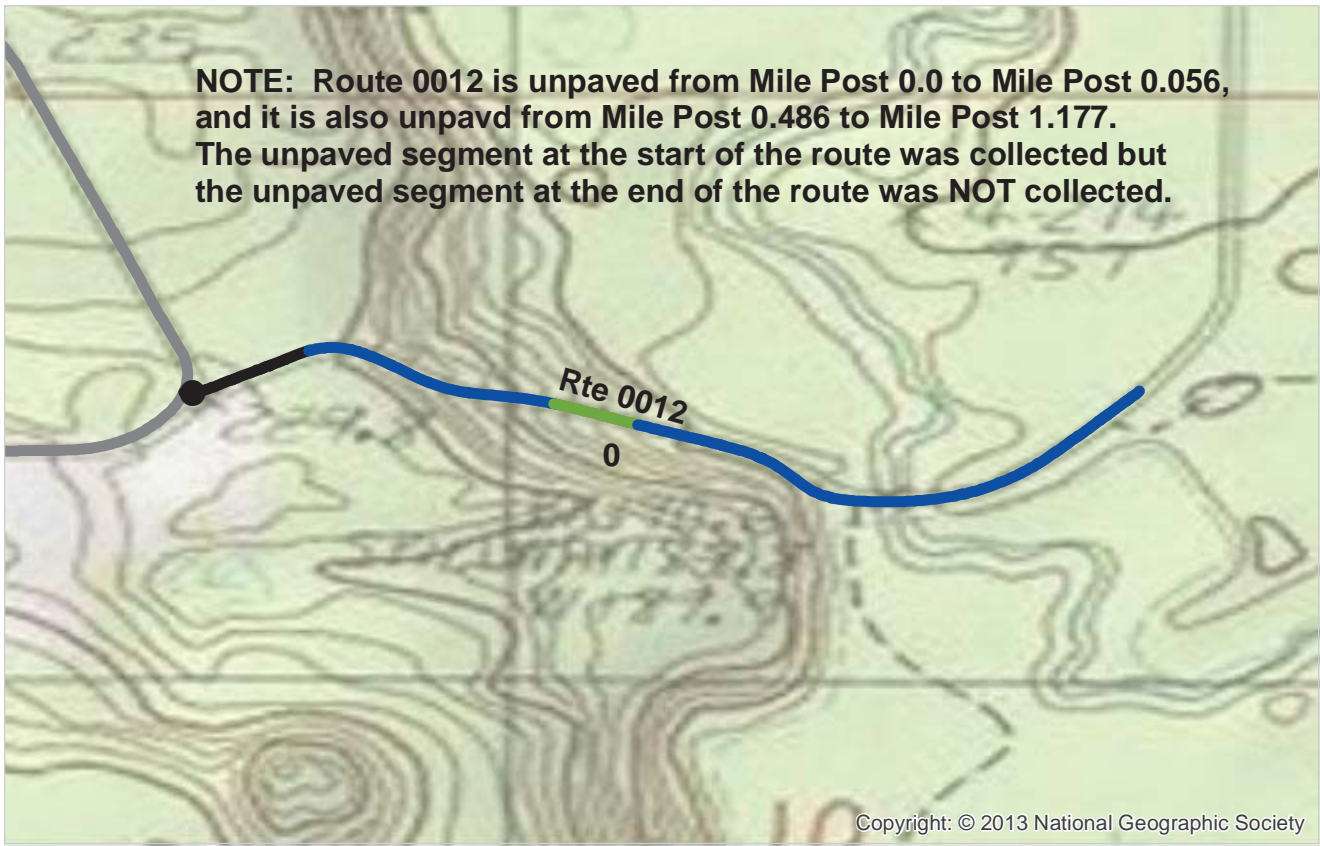
See Section 10 for explanation of SCR, PCR, & all Distress Index Values.

NC - Not Collected N/A - Not Applicable



ROUTE: 0011 MINERS CASTLE ROAD

NOTE: Route 0012 is unpaved from Mile Post 0.0 to Mile Post 0.056, and it is also unpaved from Mile Post 0.486 to Mile Post 1.177. The unpaved segment at the start of the route was collected but the unpaved segment at the end of the route was NOT collected.



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PCR	Poor		Fair		Good		Excellent		No Data	
	(0 - 60)		(61 - 84)		(85 - 94)		(95 - 100)			

* If the PCR rating is not available for a section, the SCR rating will be displayed. See appendix for definitions and formulas.

**ROUTE: 0012 MINERS BEACH ROAD
PIRO : PICTURED ROCKS NATIONAL LAKESHORE**

**COLLECTED: 9/15/2012
TOTAL LENGTH: 0.43 Miles**

MIDWEST REGION

Section Number	0				
Section Length (mi)	0.49				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	24				
Lane Width (ft)	12				
Roadway Condition Information					
SCR (Surface Condition Rating)	98				
PCR (Pavement Condition Rating)	98				
Distress Index Values					
Structural Crack Index	99				
Transverse Cracking Index	100				
Patching Index	100				
Rutting Index	98				
Roughness Condition Index (RCI)	NC				

NOTES:

Structural Crack Index is a combination of the Longitudinal Cracking Index and Alligator Cracking Index.

See Section 10 for explanation of SCR, PCR, & all Distress Index Values.

NC - Not Collected N/A - Not Applicable

ROUTE: 0012 MINERS BEACH ROAD



PCR Poor ■ Fair ■ Good ■ Excellent ■ No Data ■
 (0 - 60) (61 - 84) (85 - 94) (95 - 100)

* If the PCR rating is not available for a section, the SCR rating will be displayed. See appendix for definitions and formulas.

ROUTE: 0018 LOG SLIDE ROAD
PIRO : PICTURED ROCKS NATIONAL LAKESHORE

COLLECTED: 9/15/2012
TOTAL LENGTH: 0.67 Miles

MIDWEST REGION

Section Number	0				
Section Length (mi)	0.67				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	18				
Lane Width (ft)	9				
Roadway Condition Information					
SCR (Surface Condition Rating)	99				
PCR (Pavement Condition Rating)	99				
Distress Index Values					
Structural Crack Index	100				
Transverse Cracking Index	100				
Patching Index	100				
Rutting Index	99				
Roughness Condition Index (RCI)	100				

NOTES:

Structural Crack Index is a combination of the Longitudinal Cracking Index and Alligator Cracking Index.
 See Section 10 for explanation of SCR, PCR, & all Distress Index Values.

NC - Not Collected N/A - Not Applicable

ROUTE: 0018 LOG SLIDE ROAD

Section 6
Manually Rated Paved Route
Condition Rating Sheets



Pictured Rocks National Lakeshore



Federal Lands Highway
Road Inventory Program

MANUALLY RATED ROUTE CONDITION RATING SHEETS

No data available for this section.

Section 7
Parking Area
Condition Rating Sheets



Pictured Rocks National Lakeshore



Federal Lands Highway
Road Inventory Program

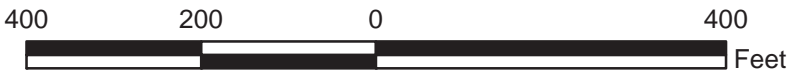
PICTURED ROCKS NATIONAL LAKESHORE

Route 0900

MUNISING FALLS PARKING
FROM WASHINGTON STREET
TO PARKING

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0900	PUBLIC	8/9/2012	39,779	0.69	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	CONCRETE CURB AND GUTTER	NO CURB	POOR/45

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

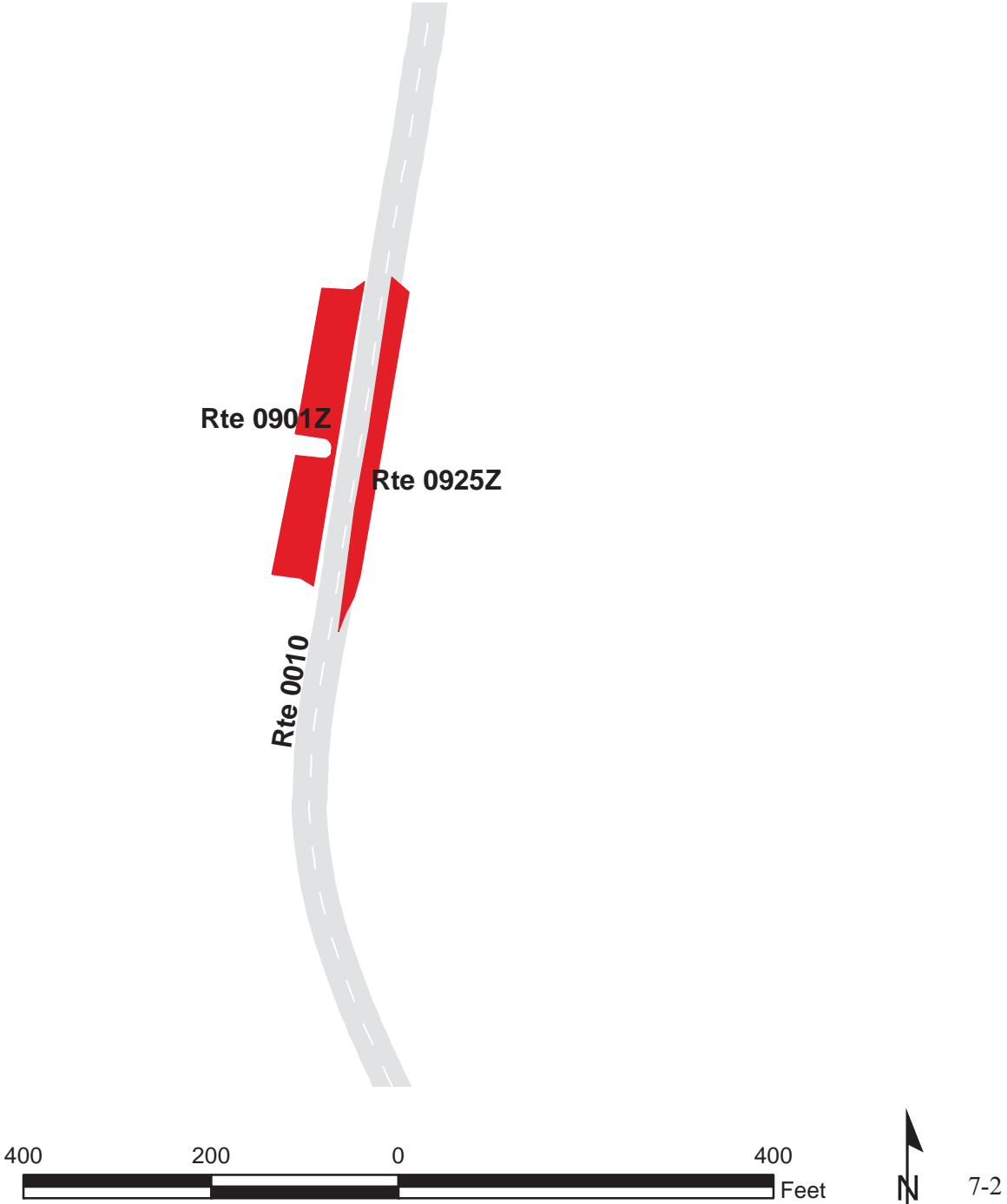
Route 0901ZZ

SAND POINT BEACH PARKING AREAS
ADJACENT TO ROUTE 0010 (SAND POINT ROAD)

Summary Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0901ZZ	PUBLIC	8/9/2012	13,196	0.23	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	SUMMARY/73

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

Route 0901Z

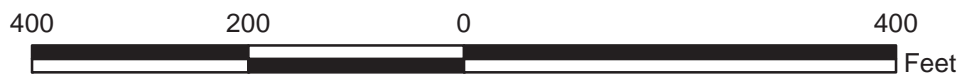
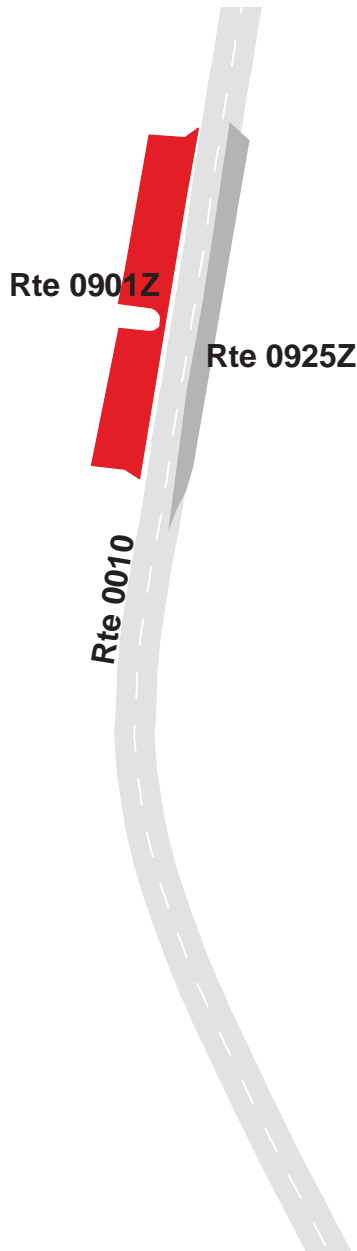
SAND POINT BEACH PARKING A

ADJACENT TO ROUTE 0010 (SAND POINT ROAD) ON LEFT

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0901Z	PUBLIC	8/9/2012	8,902	0.15	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	FAIR/73

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

Route 0925Z

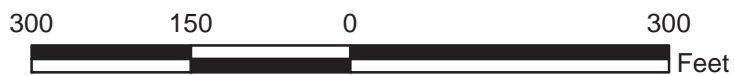
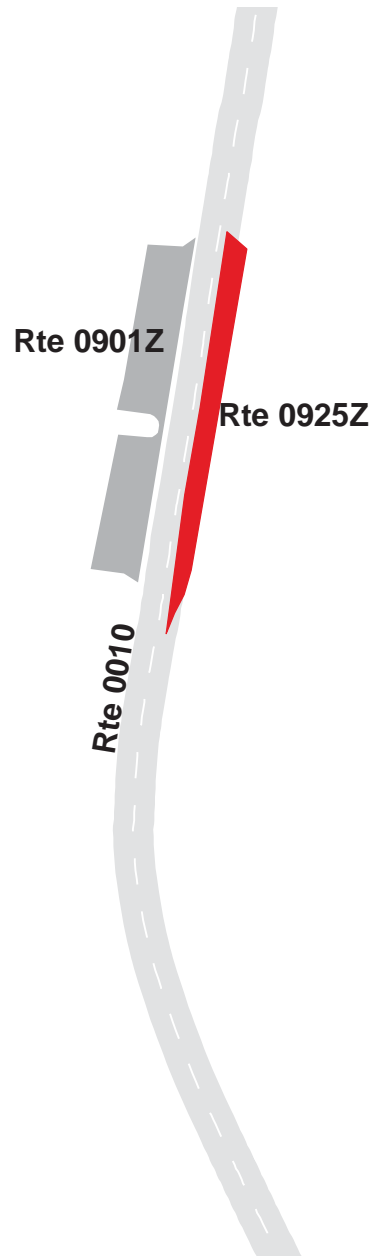
SAND POINT BEACH PARKING B

ADJACENT TO ROUTE 0010 (SAND POINT ROAD) ON RIGHT

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0925Z	PUBLIC	8/9/2012	4,294	0.07	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	FAIR/73

* Lane miles are based on 11' lane widths



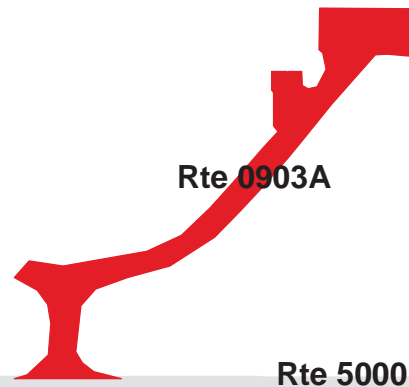
PICTURED ROCKS NATIONAL LAKESHORE

Route 0903A

MUNISING MAINTENANCE SHOP A
FROM ROUTE 5000 (COUNTY ROAD H-58)
TO PARKING

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0903A	NONPUBLIC	8/9/2012	23,076	0.40	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	2	NO CURB AND GUTTER	NO CURB	GOOD/90

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

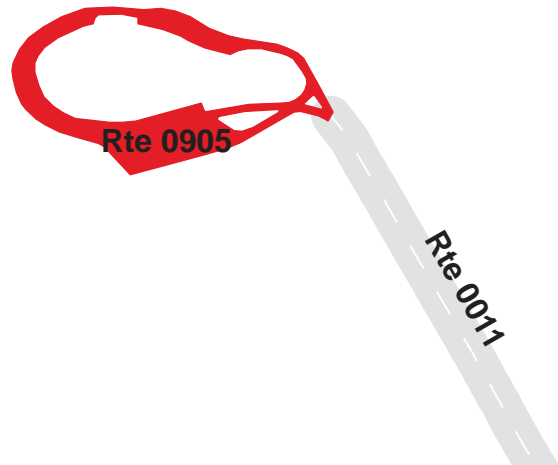
Route 0905

MINERS CASTLE PARKING

FROM END OF ROUTE 0011 (MINERS CASTLE ROAD)
TO PARKING

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0905	PUBLIC	8/8/2012	82,182	1.42	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	3	0	CONCRETE CURB AND GUTTER	NO CURB	FAIR/73

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

Route 0906

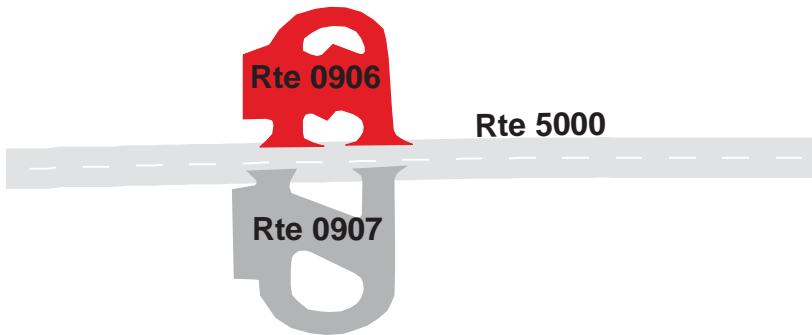
GRAND SABLE VISITOR CENTER PARKING

FROM ROUTE 5000 (COUNTY ROAD H-58)

TO ROUTE 5000 (COUNTY ROAD H-58)

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0906	PUBLIC	8/8/2012	12,155	0.21	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	FAIR/73

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

Route 0907

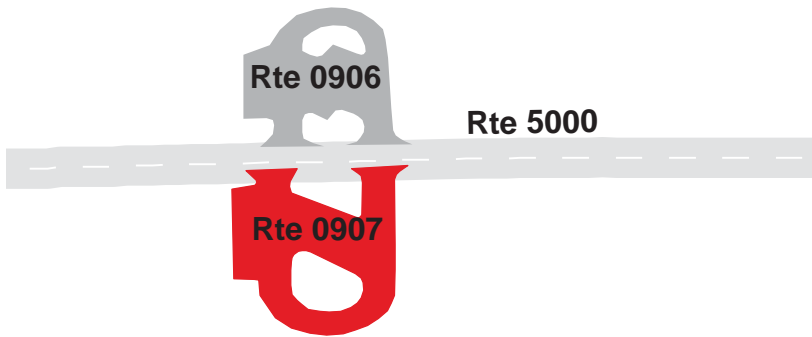
GRAND SABLE TRAILHEAD PARKING

FROM ROUTE 5000 (COUNTY ROAD H-58)

TO ROUTE 5000 (COUNTY ROAD H-58)

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0907	PUBLIC	8/8/2012	15,213	0.26	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	FAIR/73

* Lane miles are based on 11' lane widths



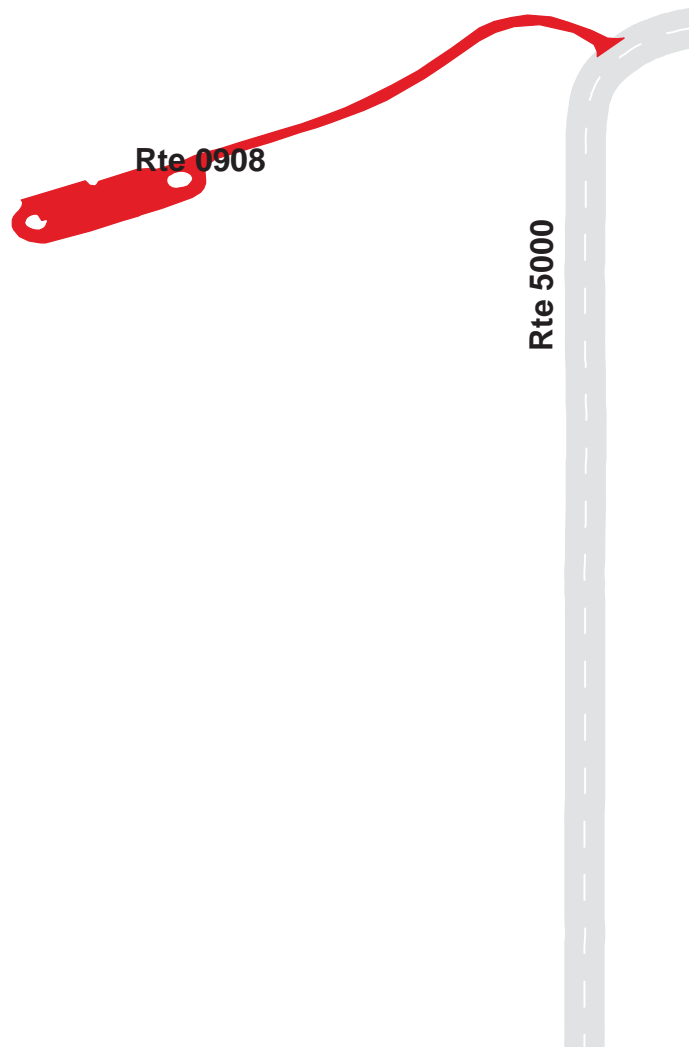
PICTURED ROCKS NATIONAL LAKESHORE

Route 0908

SABLE FALLS PARKING
FROM ROUTE 5000 (COUNTY ROAD H-58)
TO PARKING

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0908	PUBLIC	8/8/2012	57,286	0.99	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	GOOD/90

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

Route 0916

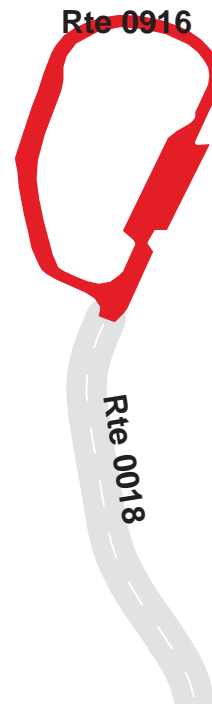
LOG SLIDE PARKING

FROM END OF ROUTE 0018 (LOG SLIDE ROAD)

TO PARKING

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0916	PUBLIC	8/8/2012	33,141	0.57	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	1	NO CURB AND GUTTER	WOOD CURB	GOOD/90

* Lane miles are based on 11' lane widths



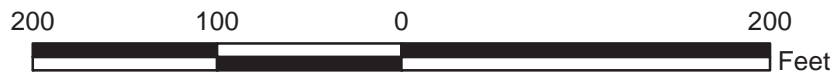
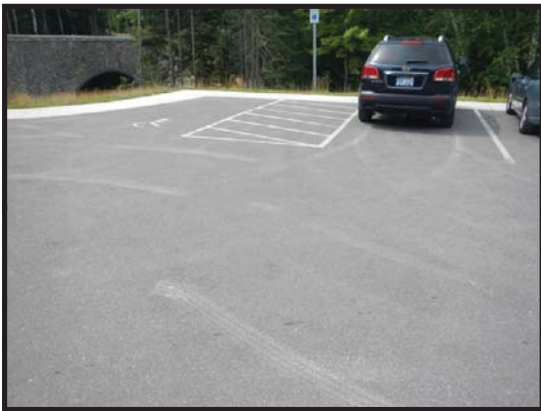
PICTURED ROCKS NATIONAL LAKESHORE

Route 0928

HURRICANE RIVER BRIDGE PARKING
FROM ROUTE 0017 (HURRICANE RIVER ROAD)
TO PARKING

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0928	PUBLIC	8/8/2012	5,803	0.10	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	GOOD/90

* Lane miles are based on 11' lane widths



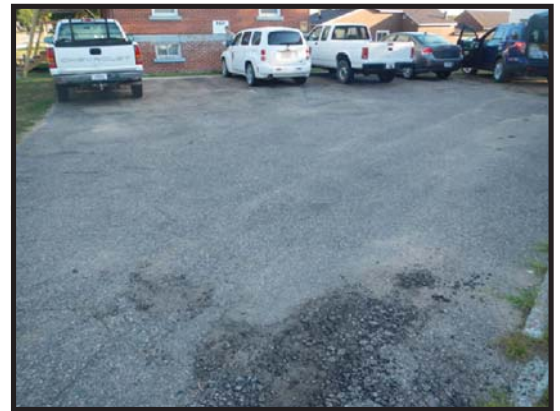
PICTURED ROCKS NATIONAL LAKESHORE

Route 0932

MUNISING RANGE LIGHT PARKING
FROM WEST MUNISING AVENUE
TO PARKING

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0932	NONPUBLIC	8/9/2012	1,780	0.03	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	CONCRETE CURB	POOR/45

* Lane miles are based on 11' lane widths



PICTURED ROCKS NATIONAL LAKESHORE

Route 0933

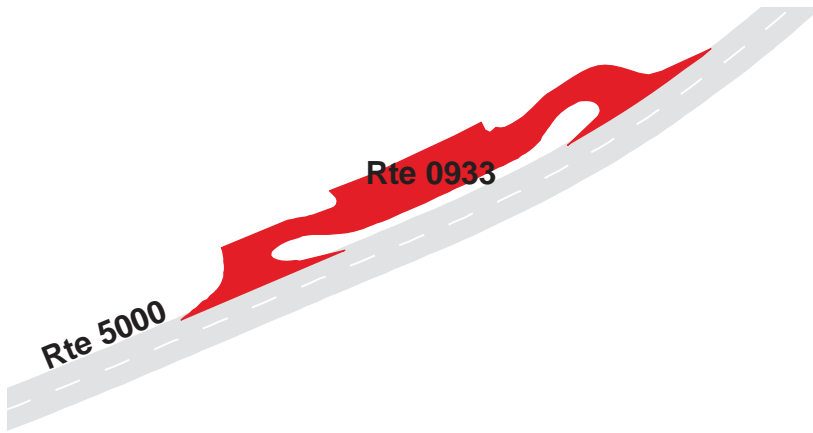
LAKE SUPERIOR OVERLOOK PARKING

FROM ROUTE 5000 (COUNTY ROAD H-58)

TO ROUTE 5000 (COUNTY ROAD H-58)

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0933	PUBLIC	8/8/2012	22,658	0.39	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	GOOD/90

* Lane miles are based on 11' lane widths



Section 8
Parkwide/Route
Maintenance Features Summaries



Pictured Rocks National Lakeshore



**Federal Lands Highway
Road Inventory Program**

PIRO: PARKWIDE MAINTENANCE FEATURES SUMMARY
Includes DCV, MRL, MRP & PKG routes collected in Cycle-5

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all DCV driven routes. Culverts, drop inlets, and gates were also collected on all Manually Rated Routes and Paved Parking areas. Those totals are reflected below.

FEATURE	LINEAR FEET	COUNT
BRIDGE	--	0
CATTLE GUARD	--	0
CULVERT	--	19
CURB	1,331	--
DROP INLET	--	8
GATE	--	3
GUARD/GUIDE RAIL	433	--
CABLE	0	--
NON-CABLE	433	--
GUARD/GUIDE WALL	0	--
BOLLARD	0	--
TEMPORARY BARRIER	0	--
NON TEMP/BOLLARD	0	--
INTERSECTION	--	19
LOW WATER CROSSING	0	0
MILE MARKER	--	0
OVERPASS	--	0
PARK BOUNDARY	--	2
PAVED DITCH	0	--
PULLOUT	354	2
RAILROAD CROSSING	--	0
RETAINING WALL	0	0
SIGN	--	88
STATE BOUNDARY	--	0
TRAFFIC LIGHT	--	0
TUNNEL	0	0

PIRO: DCV ROUTE MAINTENANCE FEATURES SUMMARY

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5.

FEATURE	ROUTE 0010 SAND POINT ROAD	ROUTE 0011 MINERS CASTLE ROAD	ROUTE 0012 MINERS BEACH ROAD	ROUTE 0018 LOG SLIDE ROAD	UNIT
BRIDGE	0	0	0	0	EACH
CATTLE GUARD	0	0	0	0	EACH
CULVERT	8	9	2	0	EACH
CURB	0	0	1,331	0	LINEAR FEET
DROP INLET	0	0	5	0	EACH
GATE	0	0	0	0	EACH
GUARD/GUIDE RAIL	0	0	433	0	LINEAR FEET
CABLE	0	0	0	0	LINEAR FEET
NON-CABLE	0	0	433	0	LINEAR FEET
GUARD/GUIDE WALL	0	0	0	0	LINEAR FEET
BOLLARD	0	0	0	0	LINEAR FEET
TEMPORARY BARRIER	0	0	0	0	LINEAR FEET
NON TEMP/BOLLARD	0	0	0	0	LINEAR FEET
INTERSECTION	9	4	3	3	EACH
LOW WATER CROSSING	0	0	0	0	EACH
LOW WATER CROSSING	0	0	0	0	LINEAR FEET
MILE MARKER	0	0	0	0	EACH
OVERPASS	0	0	0	0	EACH
PARK BOUNDARY	1	0	0	1	EACH
PAVED DITCH	0	0	0	0	LINEAR FEET
PULLOUT	1	1	0	0	EACH
PULLOUT	280	74	0	0	LINEAR FEET
RAILROAD CROSSING	0	0	0	0	EACH
RETAINING WALL	0	0	0	0	EACH
RETAINING WALL	0	0	0	0	LINEAR FEET
SIGN	33	33	15	7	EACH
STATE BOUNDARY	0	0	0	0	EACH
TRAFFIC LIGHT	0	0	0	0	EACH
TUNNEL	0	0	0	0	EACH
TUNNEL	0	0	0	0	LINEAR FEET

STRUCTURE LIST

No data available for this section.

Section 9
Route Maintenance Features
Road Logs



Pictured Rocks National Lakeshore



**Federal Lands Highway
Road Inventory Program**

PIRO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0010: SAND POINT ROAD

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all paved routes.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.000	0.000	ROUTE BEGIN	N/A	FROM END OF WASHINGTON STREET (NON NPS) AT PARK BOUNDARY SIGN
0.000	0.000	PARK BOUNDARY	N/A	N/A
0.000	0.000	SIGN	LEFT	REGULATORY, REDUCED SPEED AHEAD
0.000	0.000	INTERSECTION	N/A	PAVED ROUTE (WASHINGTON STREET / NON NPS)
0.009	0.009	SIGN	RIGHT	REGULATORY, SPEED LIMIT 25
0.009	0.009	SIGN	RIGHT	REGULATORY, UNABLE TO READ FROM VIDEO
0.152	0.152	SIGN	LEFT	GUIDE, P
0.152	0.152	SIGN	LEFT	REGULATORY, SPEED LIMIT 35
0.188	0.188	CULVERT	N/A	N/A
0.240	0.240	CULVERT	N/A	N/A
0.262	0.262	CULVERT	N/A	N/A
0.365	0.365	CULVERT	N/A	N/A
0.424	0.424	SIGN	RIGHT	GUIDE, P
0.424	0.424	SIGN	RIGHT	REGULATORY, SPEED LIMIT 35
0.426	0.426	SIGN	LEFT	GUIDE, P
0.426	0.426	SIGN	LEFT	REGULATORY, SPEED LIMIT 35
0.435	0.435	CULVERT	N/A	N/A
0.508	0.508	CULVERT	N/A	N/A
0.566	0.566	SIGN	RIGHT	REGULATORY, REDUCED SPEED AHEAD
0.566	0.566	SIGN	RIGHT	GUIDE, P
0.630	0.630	CULVERT	N/A	N/A
0.640	0.640	SIGN	RIGHT	GUIDE, P
0.640	0.640	SIGN	RIGHT	REGULATORY, SPEED LIMIT 25
0.642	0.642	SIGN	LEFT	REGULATORY, SPEED LIMIT 25
0.701	0.754	PULLOUT	LEFT	N/A
0.704	0.704	SIGN	LEFT	GUIDE, P
0.706	0.706	SIGN	RIGHT	WARNING, SLOW CHILDREN
0.727	0.727	SIGN	LEFT	GUIDE, GRAPHIC SIGN NO TEXT
0.727	0.727	SIGN	LEFT	REGULATORY, NO PARKING

PIRO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0010: SAND POINT ROAD

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all paved routes.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.743	0.743	SIGN	LEFT	GUIDE, GRAPHIC SIGN NO TEXT
0.743	0.743	SIGN	LEFT	REGULATORY, NO PARKING
0.752	0.752	SIGN	LEFT	REGULATORY, NO PARKING BEYOND THIS POINT
0.760	0.760	CULVERT	N/A	N/A
0.762	0.762	SIGN	RIGHT	GUIDE, GRAPHIC SIGN NO TEXT
0.762	0.762	SIGN	RIGHT	GUIDE, SAND POINT MARSH TRAIL NORTH COUNTRY TRAIL
0.762	0.762	SIGN	RIGHT	REGULATORY, GRAPHIC SIGN NO TEXT
0.810	0.810	INTERSECTION	LEFT	ROUTE 0901Z (SAND POINT BEACH PARKING A)
0.824	0.824	INTERSECTION	RIGHT	ROUTE 0925Z (SAND POINT BEACH PARKING B)
0.850	0.850	SIGN	RIGHT	GUIDE, PARK HEADQUARTERS MARITIME EXHIBITS
0.875	0.875	SIGN	LEFT	WARNING, SLOW CHILDREN
0.945	0.945	SIGN	LEFT	REGULATORY, SPEED LIMIT 25
1.004	1.004	SIGN	LEFT	WARNING, UNABLE TO READ FROM VIDEO
1.009	1.009	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
1.025	1.025	INTERSECTION	LEFT	ROUTE 0909 (SAND POINT HEADQUARTERS PARKING)
1.044	1.044	INTERSECTION	LEFT	ROUTE 0909 (SAND POINT HEADQUARTERS PARKING)
1.052	1.052	SIGN	LEFT	REGULATORY, N 8391
1.077	1.077	INTERSECTION	LEFT	ROUTE 0909 (SAND POINT HEADQUARTERS PARKING)
1.084	1.084	SIGN	RIGHT	REGULATORY, GRAPHIC SIGN NO TEXT
1.095	1.095	INTERSECTION	LEFT	ROUTE 0010 (SAND POINT ROAD)
1.095	1.146	ONE-WAY	N/A	N/A
1.112	1.112	SIGN	N/A	GUIDE, NO PARKING ON THIS ISLAND
1.132	1.132	SIGN	N/A	GUIDE, NO PARKING ON THIS ISLAND
1.146	1.146	INTERSECTION	LEFT	ROUTE 0010 (SAND POINT ROAD)
1.146	1.146	INTERSECTION	N/A	ROUTE 0010 (SAND POINT ROAD)
1.146	1.146	ROUTE END	N/A	TO END OF LOOP

PIRO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0011: MINERS CASTLE ROAD

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all paved routes.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.000	0.000	ROUTE BEGIN	N/A	FROM END OF COUNTY ROAD H11 AT PAVEMENT CHANGE
0.000	0.000	INTERSECTION	N/A	PAVED ROUTE (COUNTY ROAD H11 / NON NPS)
0.004	0.004	SIGN	LEFT	WARNING, 45 M P H
0.032	0.046	PULLOUT	RIGHT	N/A
0.044	0.044	SIGN	RIGHT	GUIDE, NATIONAL PARK SERVICE
0.044	0.044	SIGN	RIGHT	GUIDE, PICTURED ROCKS NATIONAL LAKESHORE
0.048	0.048	CULVERT	N/A	N/A
0.055	0.055	SIGN	RIGHT	GUIDE, PROHIBITED
0.055	0.055	SIGN	RIGHT	REGULATORY, SPEED LIMIT 35
0.152	0.152	CULVERT	N/A	N/A
0.200	0.200	CULVERT	N/A	N/A
0.412	0.412	CULVERT	N/A	N/A
0.459	0.459	SIGN	RIGHT	GUIDE, MINERS FALLS 1 MI.
0.494	0.494	INTERSECTION	RIGHT	ROUTE 0013 (MINERS FALLS ROAD)
0.495	0.495	SIGN	LEFT	GUIDE, MINERS CASTLE 2 MI. H - 58 4 MI.
0.549	0.549	SIGN	LEFT	GUIDE, MINERS FALLS 1 MI.
0.853	0.853	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
1.099	1.099	SIGN	RIGHT	REGULATORY, REDUCED SPEED AHEAD
1.325	1.325	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
1.326	1.326	SIGN	LEFT	REGULATORY, SPEED LIMIT 35
1.327	1.327	CULVERT	N/A	N/A
1.410	1.410	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
1.417	1.417	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
1.430	1.430	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
1.440	1.440	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
1.449	1.449	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
1.459	1.459	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
1.534	1.534	CULVERT	N/A	N/A
1.613	1.613	CULVERT	N/A	N/A
1.638	1.638	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT

PIRO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0011: MINERS CASTLE ROAD

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all paved routes.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
1.640	1.640	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
1.640	1.640	SIGN	RIGHT	WARNING, 15 M.P.H.
1.700	1.700	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
1.706	1.706	CULVERT	N/A	N/A
1.719	1.719	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
1.736	1.736	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
1.748	1.748	SIGN	RIGHT	GUIDE, MINERS CASTLE 0.5 MI. PICTURED ROCKS CLIFFS OVERLOOK 0.5 MI. MINERS RIVER 0.5 MI. MINERS BEACH 1 MI
1.761	1.761	INTERSECTION	RIGHT	ROUTE 0012 (MINERS BEACH ROAD)
1.764	1.764	SIGN	RIGHT	REGULATORY, GRAPHIC SIGN NO TEXT
1.764	1.764	SIGN	RIGHT	GUIDE, NO CAMPING ALLOWED IN THE MINERS AREA
1.806	1.806	SIGN	LEFT	GUIDE, MINERS RIVER 0.5 MI MINERS BEACH 1 MI H-58 6 MI
1.815	1.815	CULVERT	N/A	N/A
1.884	1.884	SIGN	LEFT	WARNING, 15 M P H
1.884	1.884	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
1.961	1.961	SIGN	RIGHT	REGULATORY, SPEED LIMIT 15
2.002	2.002	SIGN	RIGHT	REGULATORY, NO LEFT TURN
2.002	2.002	SIGN	RIGHT	REGULATORY, GRAPHIC SIGN NO TEXT
2.010	2.010	INTERSECTION	N/A	ROUTE 0905 (MINERS CASTLE PARKING)
2.010	2.010	ROUTE END	N/A	TO ROUTE 0905 (MINERS CASTLE PARKING)

PIRO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0012: MINERS BEACH ROAD

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all paved routes.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.000	0.000	ROUTE BEGIN	N/A	FROM ROUTE 0011 (MINERS CASTLE ROAD)
0.000	0.000	INTERSECTION	LEFT	ROUTE 0011 (MINERS CASTLE ROAD)
0.000	0.000	INTERSECTION	RIGHT	ROUTE 0011 (MINERS CASTLE ROAD)
0.000	0.000	SIGN	LEFT	REGULATORY, STOP
0.016	0.016	SIGN	LEFT	GUIDE, MINERS CASTLE 0.5 MI H - 58 6 MI
0.030	0.030	SIGN	RIGHT	WARNING, 20 MPH
0.030	0.030	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
0.066	0.198	CURB-AND-GUTTER	RIGHT	N/A
0.081	0.116	GUARD/GUIDE RAIL	LEFT	N/A
0.119	0.205	CURB-AND-GUTTER	LEFT	N/A
0.129	0.129	DROP INLET	RIGHT	N/A
0.129	0.129	SIGN	LEFT	WARNING, 20 M P H
0.129	0.129	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT
0.138	0.138	DROP INLET	RIGHT	N/A
0.140	0.140	DROP INLET	LEFT	N/A
0.149	0.149	SIGN	RIGHT	REGULATORY, SPEED LIMIT 25
0.169	0.169	DROP INLET	RIGHT	N/A
0.172	0.172	DROP INLET	LEFT	N/A
0.256	0.256	CULVERT	N/A	N/A
0.284	0.284	SIGN	RIGHT	WARNING, 20 M P H
0.284	0.284	SIGN	RIGHT	WARNING, GRAPHIC SIGN NO TEXT
0.303	0.337	CURB-AND-GUTTER	LEFT	N/A
0.328	0.358	GUARD/GUIDE RAIL	LEFT	N/A
0.334	0.334	SIGN	RIGHT	GUIDE, UNABLE TO READ FROM VIDEO
0.335	0.352	GUARD/GUIDE RAIL	RIGHT	N/A
0.337	0.337	SIGN	RIGHT	WARNING, DANGER
0.344	0.344	CULVERT	N/A	N/A
0.364	0.364	SIGN	RIGHT	REGULATORY, SPEED LIMIT 25
0.375	0.375	SIGN	LEFT	WARNING, 20 M P H
0.375	0.375	SIGN	LEFT	WARNING, GRAPHIC SIGN NO TEXT

PIRO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0012: MINERS BEACH ROAD

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all paved routes.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.467	0.467	SIGN	LEFT	REGULATORY, SPEED LIMIT 25
0.486	0.486	INTERSECTION	N/A	ROUTE 0012 (MINERS BEACH ROAD) UNPAVED SECTION
0.486	0.486	ROUTE END	N/A	TO ROUTE 0910 (MINERS BEACH PARKING) AT MP 1.18

PIRO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0018: LOG SLIDE ROAD

Notice: Culverts and drop inlets were marked by NPS and inventoried by RIP in Cycle 5 on all paved routes.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.000	0.000	ROUTE BEGIN	N/A	FROM ROUTE 5000 (COUNTY ROAD H-58) / PARK BOUNDARY
0.000	0.000	PARK BOUNDARY	N/A	N/A
0.000	0.000	INTERSECTION	RIGHT	ROUTE 5000 (COUNTY ROAD H-58)
0.000	0.000	INTERSECTION	LEFT	ROUTE 5000 (COUNTY ROAD H-58)
0.005	0.005	SIGN	LEFT	REGULATORY, STOP
0.059	0.059	SIGN	RIGHT	GUIDE, PICTURED ROCKS NATIONAL LAKESHORE
0.086	0.086	SIGN	RIGHT	GUIDE, GRAPHIC SIGN NO TEXT
0.106	0.106	SIGN	RIGHT	REGULATORY, SPEED LIMIT 25
0.645	0.645	SIGN	LEFT	REGULATORY, SPEED LIMIT 25
0.668	0.668	SIGN	N/A	REGULATORY, SITE MAP
0.668	0.668	INTERSECTION	N/A	ROUTE 0916 (LOG SLIDE PARKING)
0.668	0.668	SIGN	LEFT	REGULATORY, DO NOT ENTER
0.668	0.668	ROUTE END	N/A	TO ROUTE 0916 (LOG SLIDE PARKING)

Section 10 Appendix



Pictured Rocks National Lakeshore



Federal Lands Highway
Road Inventory Program

Explanation of Changes to the RIP Index Equations and Determination of PCR

In 2005, the FHWA began implementing the use of a Pavement Management System to assist the National Park Service in prioritizing Pavement Maintenance and Rehabilitation activities. The PMS used by FHWA is the Highway Pavement Management Application (HPMA) and this software 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, 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 in relation to the distresses and indexes that comprise the Pavement Condition Rating (PCR), an extensive study was completed throughout 2010 that resulted in changes to the Road Inventory Program 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.

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 to ensure that an improvement was achieved between the relationship of PCR and the actual Maintenance and Rehabilitation needs that were represented. These 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.

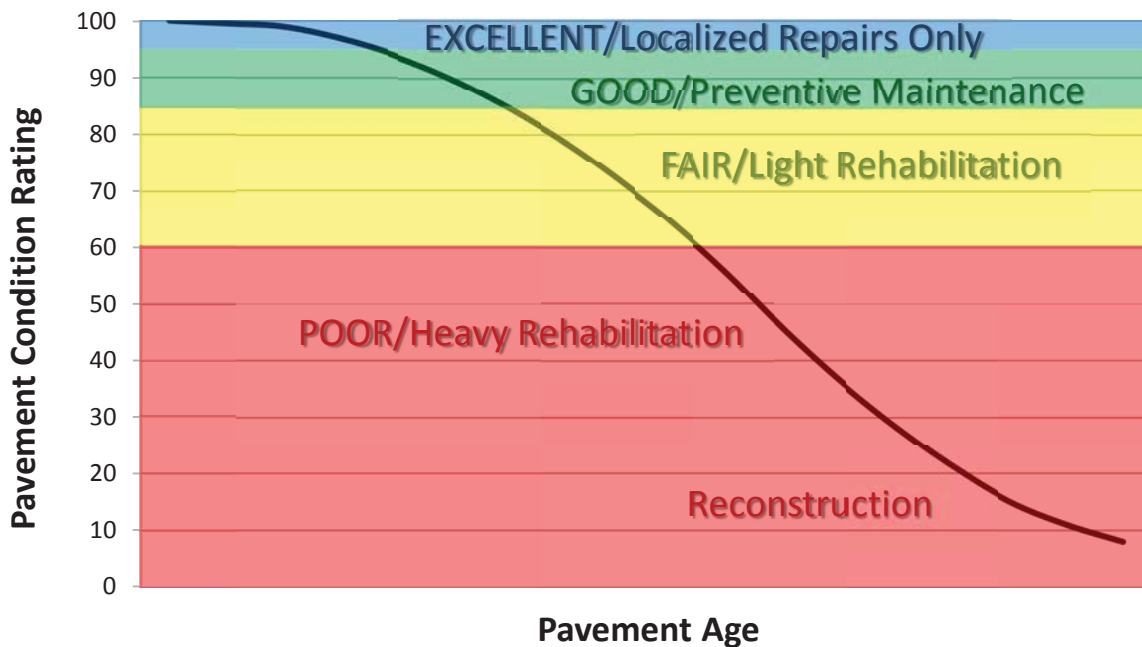
Explanation of the Excellent, Good, Fair and Poor Condition Descriptions

In addition to the RIP Index changes that were implemented in Cycle 5, we will 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.

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 Pavement Management System's data from our Highway Pavement Management Application (HPMA) please contact the Eastern Federal Lands pavement team.

Condition Categories and Treatments



DESCRIPTION OF RATING SYSTEM

The Federal Highway Administration (FHWA), National Park Service Road Inventory Program (NPS-RIP), collects condition data on paved roads, parkways, and parking areas in park units nationwide. Road surface condition data is collected using an automated Data Collection Vehicle (DCV). Roads having brick, cobblestone, or wood surfaces are not normally surveyed with the DCV, but are manually rated for the purpose of assigning a condition rating. Unpaved roads, parkways, and parking areas are not currently being evaluated for condition. Paved campground pads and driveways are also not currently being evaluated for condition.

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 high quality digital photography and automated crack detection software, FHWA RIP is tasked with executing a pavement condition assessment on about 5000 miles of National Park Service roads and parkways. 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. The FHWA RIP distress types are similar to those described in the LTPP manual with some modifications. The document, “*Distress Identification Manual for the NPS Road Inventory Program, Cycle 5, 2010-2013*” 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 NPS-RIP.

In 2010, FHWA RIP began the fifth cycle of data collection in national parks. For Cycle 5, data will be collected in approximately 81 large parks (10 or more paved route miles) on Functional Class 1, 2, and 7 routes plus any new routes or parking areas previously not collected, totaling an estimated 4,459 paved route miles. Additionally, 231 small parks will be collected comprising approximately 529 paved route miles and associated paved parking areas. The data is used to support the National Park Service road maintenance program and Pavement Management System (PMS) developed and maintained by FHWA.

This “*Distress Identification Manual for the NPS Road Inventory Program, Cycle 5, 2010-2013*” 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 R I P Cycle 5.

SURFACE DISTRESSES

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 determined from digital images

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

Surface distress measured by DCV (Data Collection Vehicle) LRMS (Laser Rut Measuring System)

- 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 SCR (Surface Condition Rating).

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 beginning on page 8.

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 interval before it reaches MAE and fails.

The index formulas are based on a scale of 0-100. 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 (<=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 < 0 defaults to 0. Index values > 100 default 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.

TABLE 1: Distress Summary

ASPHALT-SURFACED PAVEMENT DISTRESS TYPES with RUTTING and ROUGHNESS				
DISTRESS TYPE	UNIT OF MEASURE...	...CONVERTED TO	DEFINED SEVERITY LEVELS?	MEASURED BY
Alligator Cracking	Square Feet	Percent of Lane Per 0.02 Mile	Yes	Digital Image Crack Detection Software
Transverse Cracking	Linear Feet	Number of Cracks Per 0.02 Mile	Yes	Digital Image Crack Detection Software
Longitudinal Cracking	Linear feet	Percent of Lane Length Per 0.02 Mile	Yes	Digital Image Crack Detection Software
Patching/Potholes	Square Feet	Percent of Lane Per 0.02 Mile	No	Digital Image Crack Detection Software
Rutting	Inches	Rut Depth Per 0.02 Mile	Yes	DCV – Laser Rut Measuring System (LRMS)
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**

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 of cracks with no or very few interconnecting cracks and the cracks are not spalled. Cracks are ≤ 0.25 in (6mm) in mean width. 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 >0.25 in. (6 mm) and ≤ 0.75 in. (19 mm) or any crack with a mean width ≤ 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 >0.75 in (19mm) or any crack with a mean width ≤ 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. Table 2 illustrates this.

TABLE 2: Alligator Crack Severity Levels

ALLIGATOR CRACKING SEVERITY LEVELS		Crack Pattern		
		LOW	MED	HIGH
Crack Width	LOW	L	M	H
	MED	M	M	H
	HI	H	H	H

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 of < 0.25 in. (6 mm). Sealed cracks with sealant in good condition and a width that cannot be determined.

MED

Cracks with a mean width > 0.25 in. (6 mm) and ≤ 0.75 in. (19 mm). Also, any crack with a mean width < 0.75 in. (19 mm) and adjacent random low severity cracking.

HIGH

Cracks with a mean width > 0.75 in. (19 mm). Also, any crack with a mean width < 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 < 0.25 in. (6 mm). Sealed cracks with sealant in good condition and a width that cannot be determined.

MED

Cracks with a mean width > 0.25 in. (6 mm) and ≤ 0.75 in. (19 mm). Also, any crack with a mean width < 0.75 in. (19 mm) and adjacent random low severity cracking.

HIGH

Cracks with a mean width > 0.75 in. (19 mm). Also, any crack with a mean width < 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 a patch may not exceed 0.30 mi. (0.48 km). Any full-lane width patch exceeding 0.30 mi. in length is considered a pavement change, not a patch for the purposes of distress analysis. Patching must have a quantifiable area.

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

Severity Levels

There are no stratified severities for Patching/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 $\geq 0.20''$ and $\leq 0.49''$

MED

Ruts with a measured depth $\geq 0.50''$ and $\leq 0.99''$

HIGH

Ruts with a measured depth $\geq 1.00''$

Ruts $< 0.20''$ are not included in the distress calculations.

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.

TABLE 3: IRI

IRI Descriptions	
Type of Road	Typical IRI (in/mile)
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

INDEX FORMULAS

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

Alligator Crack Index

$$AC_INDEX = 100 - 40 * [(\%LOW / 35) + (\%MED / 15) + (\%HI / 5)]$$

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

$$LC_INDEX = 100 - 40 * [(\%LOW / 175) + (\%MED / 75) + (\%HI / 25)]$$

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 ≥ 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:

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

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 alligator 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 ≥ 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

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

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.

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* are a *total percentage* of left wheelpath percentage and right wheelpath percentage added together for the respective 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 wheelpath based on 20 ruts.

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

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

In *RUT_INDEX*, the denominators 535, 205, and 40 are the Maximum Allowable Extents for each severity. In other words, the formula allows up to 53.5% low severity

ruts for a 0.02 interval before. However, since 200 is the highest measurable percentage allowed, 535% is unattainable and therefore, no amount of LOW severity rutting will cause the RUT_INDEX to fail a road. Similarly, since the MAE for MED severity rutting is 205, no amount of MED severity rutting will cause the RUT_INDEX to reach 60 and fail the road. As you can see, LOW severity rutting reaches MAE the resulting index value is 60, or failure. This formula was intentionally designed to minimize the impact of LOW and MED severity rutting on RUT_INDEX.

Roughness Condition Index (Asphalt)

$$RCI = 32 * [5 * (2.718282 ^ {(-0.0041 * AVG IRI)})]$$

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)

$$RCI = -0.0012(IRI^2) + 0.0499(IRI) + 99.542$$

For concrete, PCR = RCI

Surface Condition Rating Index

$$SCR = \text{Lowest Index Value Of: [SC_INDEX, TC_INDEX, PATCH_INDEX, RUT_INDEX]}$$

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 in Cycle 5 is collected by FHWA using a Pathway Services Inc. Data Collection Vehicle (DCV), called 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 .jpg digital imagery at a frequency of 26.4 feet.

Two forward-facing cameras are mounted above the vehicle cab, one pointed straight ahead and the other to the right shoulder providing seamless 120 degree viewing.

CAMERA SPECIFICATIONS	
Two Forward/ One Rear Facing	
Camera lens/type	FUJINON CCTV LENS H16x10B-Y41
Focal length	10 mm – 160 mm
Image size	8.8 mm x 6.6mm
Image format	*.jpg
Image resolution	HD 2000 X 1200
Image pixel size	depends on distance
Zoom ratio	16x
Max Relative Aperture	1:2.5
Iris range	F25-T800 (Equivalent to F800)

Pavement images are created using a Laser Scan Imaging System. This system is composed of a single high resolution line-scan camera and two lasers configured to image an approximate 11-foot wide lane with 1 mm resolution.

CAMERA SPECIFICATIONS	
Pavement Line Scan	
Image size	4280 pixels/line
Image width	4 meters (3950 mm nominal)
Laser class	3B
Power	250W
Vehicle speed limitations	62 mph
Environment	Dry pavement, day or night
Sensor size (approx)	300 mm(H) x 375 mm(L) x 200 mm(D)
Image frame length	26.4 feet

DMI (Distance Measuring Instrument)

The DMI (Distance Measuring Instrument) obtains road length measurements that are accurate to 0.1% 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)

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.

IRI SPECIFICATIONS	
Reported IRI units	Inches/mile
Vehicle speed limitations	12-62 mph
IRI equipment certification	Texas Transportation Institute (TTI)
Wavelengths accommodated	6 in. – 300 feet
IRI computed & reported	World Bank Technical Paper Number 46
Environment	Dry pavement, day or night, above 32 degrees F
Adherence to specifications	ASTM E950-98 (2004), ASTM E 1926-08, AASHTO MP 11-08, AASHTO PP 49-08

RUTTING

Rutting depths are measured using an INO Laser Rut Measurement System (LRMS). This system is a transverse profiling device that detects and characterizes pavement rutting. The LRMS can acquire full 4 meter width profiles of a pavement lane at normal traffic speeds and uses two laser profilers that digitize transverse sections of the pavement.

RUTTING SPECIFICATIONS	
Reported rut depth units	Inches
Vehicle speed limitations	Up to 62 mph
Sampling rate	30-150 profiles/second
Transverse resolution	1280 points/profile
Transverse field-of-view	4 m
Depth accuracy (nominal)	+/- 1 mm
Environment	Dry pavement, day or night, above 32 degrees F
Adherence to specifications	ASTM E1703M-95 (reapproved 2005)

GPS & INERTIAL SYSTEMS

GPS is collected by an onboard system employing OmniSTAR real-time correction and a gyroscope (spin-type) to provide accurate positioning data (pitch/roll/heading) in instances of satellite obstruction. All GPS coordinates are tied to image and linear distance measurements.

GPS SPECIFICATIONS	
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	+/- 0.5 degrees
Grade	+/- 0.5 degrees

GPS on Manually Rated Roads (MRR)

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 backpack units. Paved cam pground pads and driveways are not typically included in the inventory or GPS.

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 tabular and geographic data. It will allow RIP to facilitate easier updates and enhancements in the future.

A geodatabase can be thought of as simply a database containing spatial data. Many different tables are contained within the park's geodatabase. 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. The metadata portion of the geodatabase also includes a data dictionary report functionality that formats the metadata into an easy to read report.

GLOSSARY OF TERMS AND ABBREVIATIONS

<u>TERM OR ABBREVIATION</u>	<u>DESCRIPTION OR DEFINITION</u>
AC	Alligator Cracking
CRS	Condition Rating Sheets (Section 5)
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
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