



Federal Lands Highway Road Inventory Program

Road Inventory and Condition Assessment



Lassen Volcanic National Park

LAVO - 8400

Cycle 5 Report

**Prepared By: Federal Highway Administration
Road Inventory Program (RIP)
Data Collection Date: 08/2010
Report Date: 12/2011**

Lassen Volcanic National Park in California





DCV = Data Collection Vehicle

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Section 1

Introduction



Lassen Volcanic National Park



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 168 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

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Section 2

Park Route Inventory



Lassen Volcanic National Park



Federal Lands Highway
Road Inventory Program

Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 12/20/2011

(Numerical By Route #)

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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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■ = 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

*** Only Functional Class 1, 2, & 7 routes, and previously uncollected routes were collected in Cycle 5

LAVO

LASSEN VOLCANIC NATIONAL PARK

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	45513		LASSEN PARK ROAD	FROM SOUTH PARK BOUNDARY AND END OF ROUTE 5000 (LASSEN PEAK HIGHWAY (STATE ROUTE 89)) TO STATE HIGHWAY 44	MINERAL AND MANZANITA	29.76	0.00	29.76	1	0	AS	1,2
0100	NC	45514		BUTTE LAKE ROAD	FROM NORTH PARK BOUNDARY TO END OF LOOP	MANZANITA	0.00	2.10	2.10	2	0	GR	
0101	NC	45515		JUNIPER LAKE ROAD	FROM SOUTH PARK BOUNDARY TO JUNIPER LAKE	MINERAL	0.00	4.00	4.00	2	0	GR	
0102	NC	73412		WARNER VALLEY ROAD	FROM SOUTH PARK BOUNDARY TO DRAKESBAD	MINERAL	0.00	2.77	2.77	2	0	GR	
0200	NC	73418		JUNIPER LAKE CAMPGROUND	FROM ROUTE 0101 (JUNIPER LAKE ROAD) TO CAMPGROUND	MINERAL	0.00	0.44	0.44	3	0	GR	
0201	NC	73421		BUTTE LAKE LAUNCHING RAMP ROAD	FROM ROUTE 0100 (BUTTE LAKE ROAD) TO HORSE CORRAL ROAD	MANZANITA	0.00	0.07	0.07	2	0	GR	
0202	NC	73426		BUTTE LAKE CAMPGROUND	FROM ROUTE 0100 (BUTTE LAKE ROAD) TO CAMPGROUND	MANZANITA	0.00	1.00	1.00	3	0	GR	
0203	NC	73427		BUTTE LAKE HORSE CORRAL ROAD	FROM ROUTE 0201 (BUTTE LAKE LAUNCHING RAMP ROAD) TO END	MANZANITA	0.00	0.15	0.15	2	0	GR	
0204	5	73431		MANZANITA CAMPGROUND ACCESS ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 28.57 (ON LEFT) TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.87	0.00	0.87	2	0	AS	1
0205ZZ	4	73452		MANZANITA CAMPGROUND ROUTES	FROM ROUTE 0204 (MANZANITA CAMPGROUND ACCESS ROAD) ON RIGHT THROUGH CAMPGROUND LOOPS	MANZANITA	1.53	0.00	1.53	3	0	AS	1
0206	5	73461		MANZANITA LAKE ACCESS ROAD	FROM ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES) TO END OF LOOP	MANZANITA	0.15	0.00	0.15	2	0	AS	1
0207	5	73466		CRAGS CAMPGROUND	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 24.62 TO END OF LOOP	MANZANITA	0.30	0.00	0.30	2	0	AS	2
0208	5	73471		LOST CREEK CAMPGROUND	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 24.42 TO END OF LOOP	MANZANITA	0.29	0.00	0.29	2	0	AS	2
0209	5	73472		SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 16.62 TO ROUTE 0214ZZ (SUMMIT LAKE NORTH CAMPGROUND LOOPS)	MANZANITA	0.10	0.00	0.10	2	0	AS	2

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LAVO

LASSEN VOLCANIC NATIONAL PARK

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
0211	5	73475		SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 16.48 TO ROUTE 0215ZZ (SUMMIT LAKE SOUTH CAMPGROUND LOOPS)	MANZANITA	0.10	0.00	0.10	2	0	AS	2
0212	5	73477		KINGS CREEK PICNIC AREA ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 12.07 (ON RIGHT) TO END OF LOOP	MANZANITA	0.39	0.00	0.39	2	0	AS	2
0213	NC	73478		WARNER VALLEY CAMPGROUND	FROM ROUTE 0102 (WARNER VALLEY ROAD) TO END	MINERAL	0.00	0.22	0.22	2	0	GR	
0214ZZ	4	73379		SUMMIT LAKE NORTH CAMPGROUND LOOPS	FROM ROUTE 0209 (SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD) AT MP 0.03 (ON LEFT) THROUGH CAMPGROUND LOOPS	MANZANITA	0.35	0.00	0.35	3	0	AS	2
0215ZZ	4	73400		SUMMIT LAKE SOUTH CAMPGROUND LOOPS	FROM ROUTE 0211 (SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE ROAD) THROUGH CAMPGROUND LOOPS	MANZANITA	0.60	0.00	0.60	3	0	AS	2
0216	4	73479		MANZANITA CABINS LOOP	FROM ROUTE 0920C (MANZANITA STORE SPUR PARKING C) TO END OF LOOP	MANZANITA	0.00	0.46	0.46	3	36,274	GR	1
0400	NC	73481		HAT CREEK ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) TO BADGER FLAT	N/A	0.00	6.13	6.13	4	0	GR	
0401	NC	73484		BUTTE LAKE MAINTENANCE AREA ROAD	FROM ROUTE 0100 (BUTTE LAKE ROAD) TO END	MANZANITA	0.00	0.14	0.14	4	0	GR	
0402	NC	73487		BUTTE LAKE WATER RESERVOIR ROAD	FROM ROUTE 0100 (BUTTE LAKE ROAD) TO END	MANZANITA	0.00	0.21	0.21	4	0	GR	
0404	4	73488		MANZANITA EMPLOYEE RESIDENCE ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) TO UNPAVED SECTION	MANZANITA	0.18	0.00	0.18	4	0	AS	1
0405	4	73493		MANZANITA WATER TANK ROAD	FROM ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES) TO UNPAVED SECTION	MANZANITA	0.09	0.00	0.09	6	0	AS	1
0409	NC	73503		SUMMIT LAKE STOCKPILE ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) TO END	MANZANITA	0.00	0.19	0.19	4	0	GR	
0410	4	73508		SUMMERTOWN ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 29.09 TO END OF LOOP	MANZANITA	0.63	0.11	0.74	6	0	AS	1
0411	NC	73511		BUTTE LAKE DUMPSTER ROAD	FROM ROUTE 0100 (BUTTE LAKE ROAD) TO END	MINERAL	0.00	0.49	0.49	4	0	GR	

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0412ZZ	4	73514		LASSEN HEADQUARTERS / RESIDENCE AREA ROADS	FROM STATE ROUTE 36 THROUGH HEADQUARTERS AREA	MINERAL	1.36	0.00	1.36	4	0	AS	3
0417	NC	73589		LOST CREEK HELICOPTER PAD ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) TO HELIPAD	MANZANITA	0.00	0.25	0.25	6	0	GR	
0418	4	73591		REFLECTION LAKE ROAD	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 28.84 TO END OF LOOP	MANZANITA	0.37	0.00	0.37	6	0	AS	1
0420	NC	231786		HEADQUARTERS WATER TANK ROAD	FROM ROUTE 0412ZZ (LASSEN HEADQUARTERS / RESIDENCE AREA ROADS) TO END AT WATER TANK	MINERAL	0.00	0.22	0.22	6	0	GR	
0421	NC	80159		WATER TREATMENT ROAD SW	FROM ROUTE 0010 (LASSEN PARK ROAD) TO END	MINERAL	0.00	0.50	0.50	6	0	GR	
0422	NC	80160		WATER TREATMENT ROAD SUMMIT LAKE	FROM ROUTE 0010 (LASSEN PARK ROAD) TO END	MANZANITA	0.00	1.00	1.00	6	0	GR	
0423	NC	80161		WATER TREATMENT ROAD LOST CREEK	FROM ROUTE 0010 (LASSEN PARK ROAD) TO END	MANZANITA	0.00	2.00	2.00	6	0	GR	
0424	NC	81691		WATER TREATMENT ROAD DRAKESBAD WARNER VALLEY	FROM ROUTE 0102 (WARNER VALLEY ROAD) TO END	MINERAL	0.00	0.25	0.25	6	0	GR	
0425	NC	81693		WATER TREATMENT ROAD WARNER VALLEY RANGER STATION	FROM ROUTE 0102 (WARNER VALLEY ROAD) TO END	MINERAL	0.00	0.20	0.20	6	0	GR	
0900	4	73597		LASSEN HEADQUARTERS PARKING	FROM STATE HIGHWAY 36 TO ROUTE 0412ZZ (LASSEN HEADQUARTERS / RESIDENCE AREA ROADS)	MINERAL	0.00	0.00	0.00		21,896	AS	3
0901	4	73601		NATURALIST DIVISION ANNEX PARKING	FROM ROUTE 0412ZZ (LASSEN HEADQUARTERS / RESIDENCE AREA ROADS) TO PARKING	MINERAL	0.00	0.00	0.00		8,434	AS	3
0902ZZ	4	73607		PARK HEADQUARTERS RANGER / MAINTENACE PARKING AREAS	ADJACENT TO ROUTE 0412ZZ (LASSEN HEADQUARTERS / RESIDENCE AREA ROADS)	MINERAL	0.00	0.00	0.00		87,369	AS	3
0903	4	73610		CROSSROAD PAVILION PARKING	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 29.73 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		26,919	AS	1

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LASSEN VOLCANIC NATIONAL PARK

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0904	4	73616		MANZANITA MAINTENANCE PARKING	ADJACENT TO ROUTE 0404 (MANZANITA EMPLOYEE RESIDENCE ROAD) AT MP 0.05 (ON LEFT)	MANZANITA	0.00	0.00	0.00		18,052	AS	1
0906ZZ	5	73618		SOUTHWEST VISITORS CENTER PARKING AREAS	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.0 (ON RIGHT) TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.12 (ON RIGHT)	MINERAL	0.00	0.00	0.00		87,586	AS	2
0908	4	73621		SULPHUR WORKS PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.91 (ON LEFT) TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.94 (ON LEFT)	MINERAL	0.00	0.00	0.00		19,478	AS	2
0909	5	73623		LAKE HELEN PICNIC AREA LOOP	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 7.03 (ON LEFT)	MINERAL	0.00	0.00	0.00		16,851	AS	2
0910	4	73625		KINGS CREEK PICNIC AREA TURNOUT PARKING	FROM ROUTE 0212 (KINGS CREEK ROAD) AT MP 0.20 (ON RIGHT) TO ROUTE 0212 (KINGS CREEK ROAD) AT MP 0.22 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		3,322	AS	2
0911	4	73626		SUMMIT LAKE SOUTH CAMPGROUND PARKING	ADJACENT TO ROUTE 0215ZZ (SUMMIT LAKE SOUTH CAMPGROUND LOOPS)	MANZANITA	0.00	0.00	0.00		2,178	AS	2
0912A	4	73628		SUMMIT LAKE NORTH CAMPGROUND PARKING A	ADJACENT TO ROUTE 0209 (SUMMIT LAKE NORTH CAMPGROUND) AT MP 0.06 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		3,397	AS	2
0912B	4	105047		SUMMIT LAKE NORTH CAMPGROUND PARKING B	ADJACENT TO ROUTE 0209 (SUMMIT LAKE NORTH CAMPGROUND) AT MP 0.09 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		1,790	AS	2
0913	NC	73629		SUMMIT LAKE RANGER STATION PARKING	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)	MANZANITA	0.00	0.00	0.00		0	GR	
0914	4	73633		DEVASTATED AREA INTERPRETIVE TRAIL PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 19.73 (ON RIGHT) TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 19.79 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		22,016	AS	2
0915	4	73635		HAT LAKE PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 19.27 (ON RIGHT) TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 19.30 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		6,370	AS	2
0916A	4	105048		DERSCHE MEADOWS PULLOUT PARKING A	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 16.93 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		1,858	AS	2

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LAVO

LASSEN VOLCANIC NATIONAL PARK

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
0916B	4	105049		DERSCHE MEADOWS PULLOUT PARKING B	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 16.96 (ON LEFT)	MANZANITA	0.00	0.00	0.00		1,253	AS	2
0917	4	73638		HOT ROCK PARKING	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 21.74 (ON LEFT)	MANZANITA	0.00	0.00	0.00		5,561	AS	2
0918	4	73640		LOST CREEK GROUP CAMP PARKING	ADJACENT TO ROUTE 0208 (LOST CREEK CAMPGROUND)	MANZANITA	0.00	0.00	0.00		1,696	AS	2
0919	4	73642		CRAGS PARKING	ADJACENT TO ROUTE 0207 (CRAGS CAMPGROUND)	MANZANITA	0.00	0.00	0.00		1,750	AS	2
0920A	4	73645		MANZANITA STORE SPUR PARKING A	ADJACENT TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.00	0.00	0.00		4,911	AS	1
0920B	4	105050		MANZANITA STORE SPUR PARKING B	ADJACENT TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.00	0.00	0.00		3,732	AS	1
0920C	4	105075		MANZANITA STORE SPUR PARKING C	FROM ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES) TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.00	0.00	0.00		13,254	AS	1
0921A	4	73647		MANZANITA LAKE ACCESS PARKING A	FROM ROUTE 0206 (MANZANITA LAKE ACCESS ROAD) AT MP 0.02 (ON RIGHT) TO PARKING	MANZANITA	0.00	0.00	0.00		5,698	AS	1
0921B	4	105076		MANZANITA LAKE ACCESS PARKING B	ADJACENT TO ROUTE 0206 (MANZANITA LAKE ACCESS ROAD) AT MP 0.06 (ON RIGHT)	MANZANITA	0.00	0.00	0.00		6,754	AS	1
0922	4	73648		MANZANITA DUMP STATION PARKING	FROM ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES) TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.00	0.00	0.00		10,858	AS	1
0923	4	73649		LASSEN PEAK TRAILHEAD PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 7.86 (ON LEFT) TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 7.91 (ON LEFT)	MINERAL	0.00	0.00	0.00		97,955	AS	2
0924	4	73651		LOOMIS MUSEUM PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 28.65 (ON LEFT) TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.00	0.00	0.00		24,333	AS	1
0926	4	73653		BUMPASS PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 6.72 (ON RIGHT) TO PARKING	MINERAL	0.00	0.00	0.00		36,660	AS	2

Cycle 5 NPS/RIP Route ID Report

Road Inventory Program 12/20/2011

(Numerical By Route #)

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Shading Color Key:
Red text denotes approx. mileage

White = Paved Routes, DCV Driven

Yellow = Unpaved Routes, DCV not Driven

Blue = All Paved Parking Areas

Green = All Unpaved Parking Areas

Grey = Paved Routes, DCV not Driven

Black = State, Local or Private non-NPS Routes

■ = Concession Route Flag ON

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** DCV - Data Collection Vehicle

*** Only Functional Class 1, 2, & 7 routes, and previously uncollected routes were collected in Cycle 5

LAVO

LASSEN VOLCANIC NATIONAL PARK

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
0928	NC	73655		BALL FIELD PARKING	ADJACENT TO ROUTE 0412ZZ (MAINTENANCE SERVICE ROAD)	MINERAL	0.00	0.00	0.00		0	GR	
0929A	4	73657		EMERALD LAKE PICNIC AREA PARKING A	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 6.25 (ON RIGHT)	MINERAL	0.00	0.00	0.00		5,027	AS	2
0929B	4	105077		EMERALD LAKE PICNIC AREA PARKING B	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 6.39 (ON RIGHT)	MINERAL	0.00	0.00	0.00		4,763	AS	2
0931	4	73660		MAINTENANCE SERVICE RV PARKING	FROM ROUTE 0412ZZ (MAINTENANCE SERVICE ROAD) AT MP 0.14 (ON RIGHT) TO PARKING	MINERAL	0.00	0.00	0.00		8,565	AS	3
0932	4	73662		LILY POND TRAILHEAD PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 28.61 (ON RIGHT) TO PARKING	MANZANITA	0.00	0.00	0.00		6,463	AS	1
0933	4	73663		LITTLE HOT SPRINGS OVERLOOK PARKING	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 4.98 (ON RIGHT)	MINERAL	0.00	0.00	0.00		14,068	AS	2
0935	4	73665		MANZANITA OLD RESTROOM PARKING	ADJACENT TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.00	0.00	0.00		1,390	AS	1
0936	NC	73666		CHAOS CRAGS TRAILHEAD PARKING	ADJACENT TO ROUTE 0205ZZ (MANZANITA CAMPGROUND ROUTES)	MANZANITA	0.00	0.00	0.00		0	GR	
0937	4	73667		SUMMIT LAKE TRAILHEAD PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 16.9 (ON RIGHT) TO PARKING	MANZANITA	0.00	0.00	0.00		10,668	AS	2
0938ZZ	5	73668		KINGS CREEK TRAILHEAD PARKING AREAS	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)	MANZANITA	0.00	0.00	0.00		7,582	AS	2
0939	NC	73669		KINGS CREEK PARKING	ADJACENT TO ROUTE 0212 (KINGS CREEK ROAD)	MANZANITA	0.00	0.00	0.00		0	GR	
0940	NC	73670		MANZANITA SERVICE PARKING	ADJACENT TO ROUTE 0410 (SUMMERTOWN ROAD) AT MP 0.06 (ON LEFT)	MANZANITA	0.00	0.00	0.00		0	GR	
0941	4	73671		MANZANITA RECYCLE CENTER PARKING	ADJACENT TO ROUTE 0410 (SUMMERTOWN ROAD) AT MP 0.16 (ON LEFT)	MANZANITA	0.00	0.00	0.00		3,119	AS	1
0942ZZ	4	73673		MANZANITA RESIDENCE PARKING AREAS	ADJACENT TO ROUTE 0404 (MANZANITA EMPLOYEE RESIDENCE ROAD) ON LEFT AND RIGHT	MANZANITA	0.00	0.00	0.00		12,249	AS	1

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(Numerical By Route #)

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** DCV - Data Collection Vehicle

*** Only Functional Class 1, 2, & 7 routes, and previously uncollected routes were collected in Cycle 5

LAVO

LASSEN VOLCANIC NATIONAL PARK

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
0943A	4	73675		REFLECTION LAKE PARKING A	ADJACENT TO ROUTE 0418 (REFLECTION LAKE ROAD) AT END LOOP	MANZANITA	0.00	0.00	0.00		1,181	AS	1
0943B	4	105081		REFLECTION LAKE PARKING B	ADJACENT TO ROUTE 0418 (REFLECTION LAKE ROAD) AT END LOOP	MANZANITA	0.00	0.00	0.00		5,246	AS	1
0944	4	73677		NORTHWEST MANZANITA FEE STATION PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 29.15 (ON LEFT) TO PARKING	MANZANITA	0.00	0.00	0.00		1,813	AS	1
0945	4	73678		TERRACE LAKE PARKING	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 9.78 (ON LEFT)	MANZANITA	0.00	0.00	0.00		5,267	AS	2
0947	4	105037		BROKEOFF TRAILHEAD PARKING	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 0.55 (ON RIGHT)	MINERAL	0.00	0.00	0.00		8,789	AS	2
5000	4			LASSEN PEAK HIGHWAY (STATE ROUTE 89)	FROM STATE ROUTE 36 TO BEGINNING OF ROUTE 0010 (LASSEN PARK ROAD) AT SOUTHERN PARK BOUNDARY	MINERAL	4.36	0.00	4.36		0	AS	2

Cycle 5 NPS/RIP Route ID Report

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(Numerical By Route #)

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CYCLE 5 COLLECTED SUMMARY TOTALS FOR LASSEN VOLCANIC NATIONAL PARK

CYCLE 5 COLLECTED ROUTE TOTALS		CYCLE 5 COLLECTED CONCESSION TOTALS	
DCV Driven Route Miles	31.96	Concession Paved Route Miles	0.00
Manually Rated Route Miles	0.00	Concession Paved Parking Area SQFT	0
TOTAL PARK ROUTE MILES COLLECTED IN CYCLE 5	31.96	Concession Manually Rated Rotes SQFT	0
Manually Rated Routes (SQFT)	0	CYCLE 5 COLLECTED WEIGHTED AVERAGE PARK VALUES	
* CYCLE 5 COLLECTED PARKING AREA TOTALS		DCV Driven PCR	99
Paved Parking (SQFT)	112,019	**Manually Rated Routes PCR	N/A
		**Parking PCR	92
		***Total Equivalent Lane Miles	68.30

TOTAL PARK SUMMARY FOR LASSEN VOLCANIC NATIONAL PARK

ROUTE TOTALS	
TOTAL PAVED PARK ROUTE MILES	37.07
TOTAL PAVED PARKING (SQFT)	832,907

* - 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 Assets. 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 LAVO

Road Inventory Program 12/09/2011

(Numerical By Subcomponent #)

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LAVO

LASSEN VOLCANIC NATIONAL PARK

Asset Entered in FMSS System

Rte. No.	FMSS No.	Cycle Collected	Route Name	From	To	Concession Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
0205ZZ	73452	4	MANZANITA CAMPGROUND ROUTES	FROM ROUTE 0204 (MANZANITA CAMPGROUND ACCESS ROAD) ON RIGHT	THROUGH CAMPGROUND LOOPS		3	1.53	0.00	1.53	0
0214ZZ	73379	4	SUMMIT LAKE NORTH CAMPGROUND LOOPS	FROM ROUTE 0209 (SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD) AT MP 0.03 (ON LEFT)	THROUGH CAMPGROUND LOOPS		3	0.35	0.00	0.35	0
0215ZZ	73400	4	SUMMIT LAKE SOUTH CAMPGROUND LOOPS	FROM ROUTE 0211 (SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE ROAD)	THROUGH CAMPGROUND LOOPS		3	0.60	0.00	0.60	0
0412ZZ	73514	4	LASSEN HEADQUARTERS / RESIDENCE AREA ROADS	FROM STATE ROUTE 36	THROUGH HEADQUARTERS AREA		4	1.36	0.00	1.36	0
0902ZZ	73607	4	PARK HEADQUARTERS RANGER / MAINTENACE PARKING AREAS	ADJACENT TO ROUTE 0412ZZ (LASSEN HEADQUARTERS / RESIDENCE AREA ROADS)				0.00	0.00	0.00	87,369
0906ZZ	73618	5	SOUTHWEST VISITORS CENTER PARKING AREAS	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.0 (ON RIGHT)	TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.12 (ON RIGHT)			0.00	0.00	0.00	87,586
0938ZZ	73668	5	KINGS CREEK TRAILHEAD PARKING AREAS	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)				0.00	0.00	0.00	7,582
0942ZZ	73673	4	MANZANITA RESIDENCE PARKING AREAS	ADJACENT TO ROUTE 0404 (MANZANITA EMPLOYEE RESIDENCE ROAD) ON LEFT AND RIGHT				0.00	0.00	0.00	12,249

NPS/RIP Subcomponent Details for LAVO

Road Inventory Program 12/09/2011

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LAVO

LASSEN VOLCANIC NATIONAL PARK

Asset LAVO-0205ZZ Subcomponent Breakdown

Rte. No.	FMSS No.	Cycle Collected	Route Name	Route Description		Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
				From	To						
0205AAZ	73452	4	MANZANITA CAMPGROUND LOOP A CUT-THRU	FROM ROUTE 0205AZ (MANZANITA CAMPGROUND LOOP A) AT MP 0.10 (ON LEFT)	TO ROUTE 0205AZ (MANZANITA CAMPGROUND LOOP A) AT MP 0.30 (ON LEFT)		3	0.03	0.00	0.03	0
0205AZ	73452	4	MANZANITA CAMPGROUND LOOP A	FROM ROUTE 0204 (MANZANITA CAMPGROUND ACCESS ROAD) AT MP 0.68 (ON RIGHT)	TO END OF LOOP		3	0.43	0.00	0.43	0
0205BAZ	73452	4	MANZANITA CAMPGROUND LOOP B CUT-THRU	FROM ROUTE 0205BZ (MANZANITA CAMPGROUND LOOP B) AT MP 0.09 (ON LEFT)	TO ROUTE 0205BZ (MANZANITA CAMPGROUND LOOP B) AT MP 0.34 (ON LEFT)		3	0.04	0.00	0.04	0
0205BZ	73452	4	MANZANITA CAMPGROUND LOOP B	FROM ROUTE 0204 (MANZANITA CAMPGROUND ACCESS ROAD) AT MP 0.75 (ON RIGHT)	TO END OF LOOP		3	0.43	0.00	0.43	0
0205CZ	73452	4	MANZANITA CAMPGROUND LOOP C	FROM ROUTE 0204 (MANZANITA CAMPGROUND ACCESS ROAD) AT MP 0.81 (ON RIGHT)	TO END OF LOOP		3	0.36	0.00	0.36	0
0205DZ	73452	4	MANZANITA CAMPGROUND LOOP D	FROM ROUTE 0204 (MANZANITA CAMPGROUND ACCESS ROAD) AT END	TO END OF LOOP		3	0.24	0.00	0.24	0

Asset LAVO-0214ZZ Subcomponent Breakdown

Rte. No.	FMSS No.	Cycle Collected	Route Name	Route Description		Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
				From	To						
0214AZ	73379	4	SUMMIT LAKE NORTH CAMPGROUND LOOP A	FROM ROUTE 0209 (SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD) AT MP 0.06 (ON LEFT)	TO ROUTE 0209 (SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD) AT MP 0.03 (ON LEFT)		3	0.16	0.00	0.16	0
0214BZ	73379	4	SUMMIT LAKE NORTH CAMPGROUND LOOP B	FROM ROUTE 0209 (SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD) AT END	TO END OF LOOP		3	0.19	0.00	0.19	0

NPS/RIP Subcomponent Details for LAVO

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LAVO

LASSEN VOLCANIC NATIONAL PARK

Asset LAVO-0215ZZ Subcomponent Breakdown

Rte. No.	FMSS No.	Cycle Collected	Route Name	Route Description		Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
				From	To						
0215CZ	73400	4	SUMMIT LAKE SOUTH CAMPGROUND LOOP C	FROM ROUTE 0215EZ (SUMMIT LAKE SOUTH CAMPGROUND LOOP E) AT MP 0.05	TO INTERSECTION OF ROUTES 0211 (SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE ROAD) AND 0215EZ (SUMMIT LAKE SOUTH CAMPGROUND LOOP E)		3	0.11	0.00	0.11	0
0215DZ	73400	4	SUMMIT LAKE SOUTH CAMPGROUND LOOP D	FROM ROUTE 0215EZ (SUMMIT LAKE SOUTH CAMPGROUND LOOP E) AT MP 0.12	TO ROUTE 0215EZ (SUMMIT LAKE SOUTH CAMPGROUND LOOP E) AT MP 0.08		3	0.18	0.00	0.18	0
0215EZ	73400	4	SUMMIT LAKE SOUTH CAMPGROUND LOOP E	FROM INTERSECTION OF ROUTES 0211 (SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE ROAD) AND 0215CZ (SUMMIT LAKE SOUTH CAMPGROUND LOOP C)	TO END OF LOOP		3	0.31	0.00	0.31	0

Asset LAVO-0412ZZ Subcomponent Breakdown

Rte. No.	FMSS No.	Cycle Collected	Route Name	Route Description		Concess Route	Func. Class	Paved Miles	Un-Paved Miles	Total Route Length	Manual Rated SQ/FT
				From	To						
0412Z	73514	4	LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD EAST	FROM ROUTE 0900 (LASSEN HEADQUARTERS PARKING)	TO ROUTE 0900 (LASSEN HEADQUARTERS PARKING)		4	0.35	0.00	0.35	0
0413Z	73514	4	LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD CUL DE SAC	FROM ROUTE 0412Z (LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD EAST)	TO ROUTE 0414Z (LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD WEST) ON LEFT AND ROUTE 0902AZ (PARK HEADQUARTERS RANGER / MAINTENANCE PARKING A) ON RIGHT		4	0.17	0.00	0.17	0
0414Z	73514	4	LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD WEST	FROM END OF ROUTE 0415Z (MAINTENANCE ACCESS ROAD (OLD VIOLA ROAD))	TO ROUTE 0412Z (LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD EAST)		4	0.35	0.00	0.35	0
0415Z	73514	4	MAINTENANCE ACCESS ROAD (OLD VIOLA ROAD)	FROM STATE HIGHWAY 36	TO START OF ROUTE 0414Z (LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD WEST)		4	0.18	0.00	0.18	0
0416Z	73514	4	MAINTENANCE SERVICE ROAD	FROM STATE HIGHWAY 36	TO END OF PAVEMENT		4	0.23	0.00	0.23	0
0419Z	73514	4	LASSEN FIRE ROAD	FROM ROUTE 0414Z (LASSEN HEADQUARTERS / RESIDENCE LOOP ROAD WEST)	TO ROUTE 0415Z (MAINTENANCE ACCESS ROAD (OLD VIOLA ROAD))		4	0.08	0.00	0.08	0

NPS/RIP Subcomponent Details for LAVO

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LAVO

LASSEN VOLCANIC NATIONAL PARK

Asset LAVO-0902ZZ 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
0902AZ	73607	4	PARK HEADQUARTERS RANGER / MAINTENANCE PARKING A	FROM ROUTE 0415Z (MAINTENANCE ACCESS ROAD (OLD VIOLA ROAD))	TO ROUTE 0415Z (MAINTENANCE ACCESS ROAD (OLD VIOLA ROAD))			0.00	0.00	0.00	81,188
0902BZ	73607	4	PARK HEADQUARTERS / FIRE STATION PARKING B	ADJACENT TO ROUTE 0419Z (LASSEN FIRE ROAD)				0.00	0.00	0.00	4,066
0902CZ	73607	4	PARK HEADQUARTERS RANGER / MAINTENANCE PARKING C	ADJACENT TO ROUTE 0419Z (LASSEN FIRE ROAD)				0.00	0.00	0.00	2,115

Asset LAVO-0906ZZ 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
0906AZ	73618	5	SOUTHWEST VISITORS CENTER PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 0.99 (ON RIGHT)	TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.12 (ON RIGHT)			0.00	0.00	0.00	83,118
0906BZ	73618	5	SERVICE ENTRY PARKING	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.09 (ON RIGHT)	TO PARKING			0.00	0.00	0.00	4,468

Asset LAVO-0938ZZ 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
0938AZ	73668	5	KINGS CREEK TRAILHEAD PARKING A	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)				0.00	0.00	0.00	3,821
0938BZ	73668	5	KINGS CREEK TRAILHEAD PARKING B	ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)				0.00	0.00	0.00	3,761

NPS/RIP Subcomponent Details for LAVO

Road Inventory Program 12/09/2011

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Green = All Unpaved Parking Areas

Grey = Paved Routes, DCV not Driven

Black = State, Local or Private non-NPS Routes

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LAVO

LASSEN VOLCANIC NATIONAL PARK

Asset LAVO-0942ZZ 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
0942AZ	73673	4	MANZANITA RESIDENCE PARKING A	ADJACENT TO ROUTE 0404 (MANZANITA EMPLOYEE RESIDENCE ROAD) AT MP 0.07 (ON RIGHT)				0.00	0.00	0.00	1,953
0942BZ	73673	4	MANZANITA RESIDENCE PARKING B	ADJACENT TO ROUTE 0404 (MANZANITA EMPLOYEE RESIDENCE ROAD) AT MP 0.16 (ON RIGHT)				0.00	0.00	0.00	3,211
0942CZ	73673	4	MANZANITA RESIDENCE PARKING C	ADJACENT TO ROUTE 0404 (MANZANITA EMPLOYEE RESIDENCE ROAD) AT MP 0.14 (ON LEFT)				0.00	0.00	0.00	4,892
0942DZ	73673	4	MANZANITA RESIDENCE PARKING D	ADJACENT TO ROUTE 0404 (MANZANITA EMPLOYEE RESIDENCE ROAD) AT MP 0.10 (ON LEFT)				0.00	0.00	0.00	2,193

ROUTE IDENTIFICATION CHANGES TO PAVED ROUTES FROM PREVIOUS CYCLE - LAVO

ROUTES MODIFIED FROM PREVIOUS INVENTORY:			
Route #	Route Name	Type of Modification	Comments
0216	Manzanita Cabins Loop	OTHER	ROUTE IS NOW UNPAVED
0906ZZ	Southwest Visitors Center Parking Areas	REALIGNED	AREA HAS BEEN RECONSTRUCTED AND THERE ARE NOW TWO PARKING AREAS AND A BUILDING WHERE CYCLE 4 ROUTE CYCLE 4 ROUTE 0906 WAS LOCATED. THE COMBINED CYCLE 5 CYCLE 5 AREA IS 87,586 SQ. FT. (ABOUT 43,083 SQ. FT. SMALLER THAN IT WAS IN CYCLE 4).
0909	Lake Helen Picnic Area Loop	REALIGNED	ROUTE WAS UNDER CONSTRUCTION IN CYCLE 4. THERE HAS BEEN AN ALIGNMENT CHANGE TO ROUTE AND THE AREA HAS INCREASED BY ABOUT 2,240 SQ. FT.
0938ZZ	Kings Creek Trailhead Parking Areas	RECENTLY CONSTRUCTED ROUTE	ROUTE WAS UNDER CONSTRUCTION DURING CYCLE 4 VISIT TO PARK. DURING THE CYCLE 5 VISIT, TWO PARKING AREAS WERE FOUND (ONE ON EACH SIDE OF ROAD) AND WERE COMBINED INTO ONE LOCATION.
0942ZZ	Manzanita Residence Parking Areas	ROUTES COMBINED	CYCLE 4 ROUTES 0942A-0942D WERE COMBINED DURING THE CYCLE 5 ROUTE ID MEETING. THESE ARE NOW ROUTES 0942AZ-0942DZ WITH 0942ZZ AS THEIR SUMMARY RECORD.
OTHER CHANGES FROM PREVIOUS INVENTORY:			
Route #	Route Name	Type of Change	Comments
0207	Crags Campground	COLLECTION METHOD CHANGE	ROUTE CHANGED FROM A MANUALLY RATED ROUTE (IN CYCLE 4) TO A DATA COLLECTION VEHICLE DRIVEN ROUTE (IN CYCLE 5)
0208	Lost Creek Campground	COLLECTION METHOD CHANGE	ROUTE CHANGED FROM A MANUALLY RATED ROUTE (IN CYCLE 4) TO A DATA COLLECTION VEHICLE DRIVEN ROUTE (IN CYCLE 5)

ROUTE IDENTIFICATION CHANGES TO PAVED ROUTES FROM PREVIOUS CYCLE - LAVO

ROUTES REMOVED FROM PREVIOUS INVENTORY:			
Route #	Route Name	Reason for Removal	Comments
0907	Southwest Entrance Kiosk Parking	OTHER	ROUTE REMOVED DURING CONSTRUCTION.

Section 3

Park Summary Information



Lassen Volcanic National Park



Federal Lands Highway
Road Inventory Program

LAVO: 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	10.88	34.04%	0.20	0.63%	0.86	2.69%	17.82	55.76%	29.76
2	0.11	0.34%	0.04	0.13%	0.10	0.31%	1.95	6.10%	2.20
3									
4									
5									
6									
7									
8									
Totals	10.99	34.39%	0.24	0.75%	0.96	3.00%	19.77	61.86%	31.96

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.

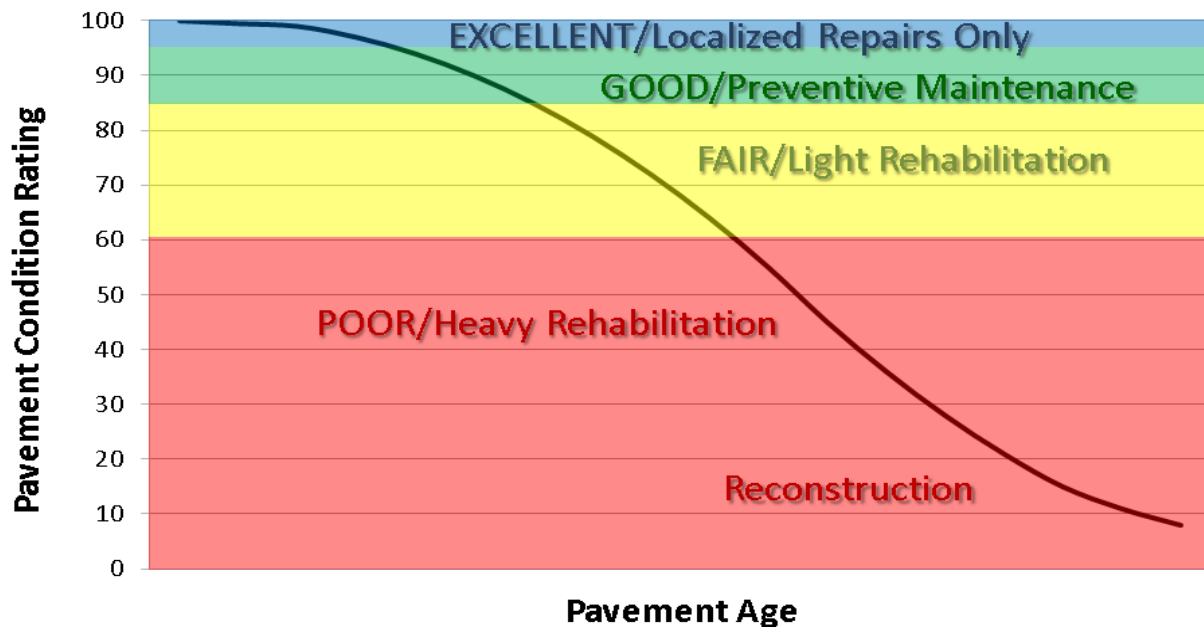
Explanation of the Excellent, Good, Fair and Poor Condition Descriptions

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.

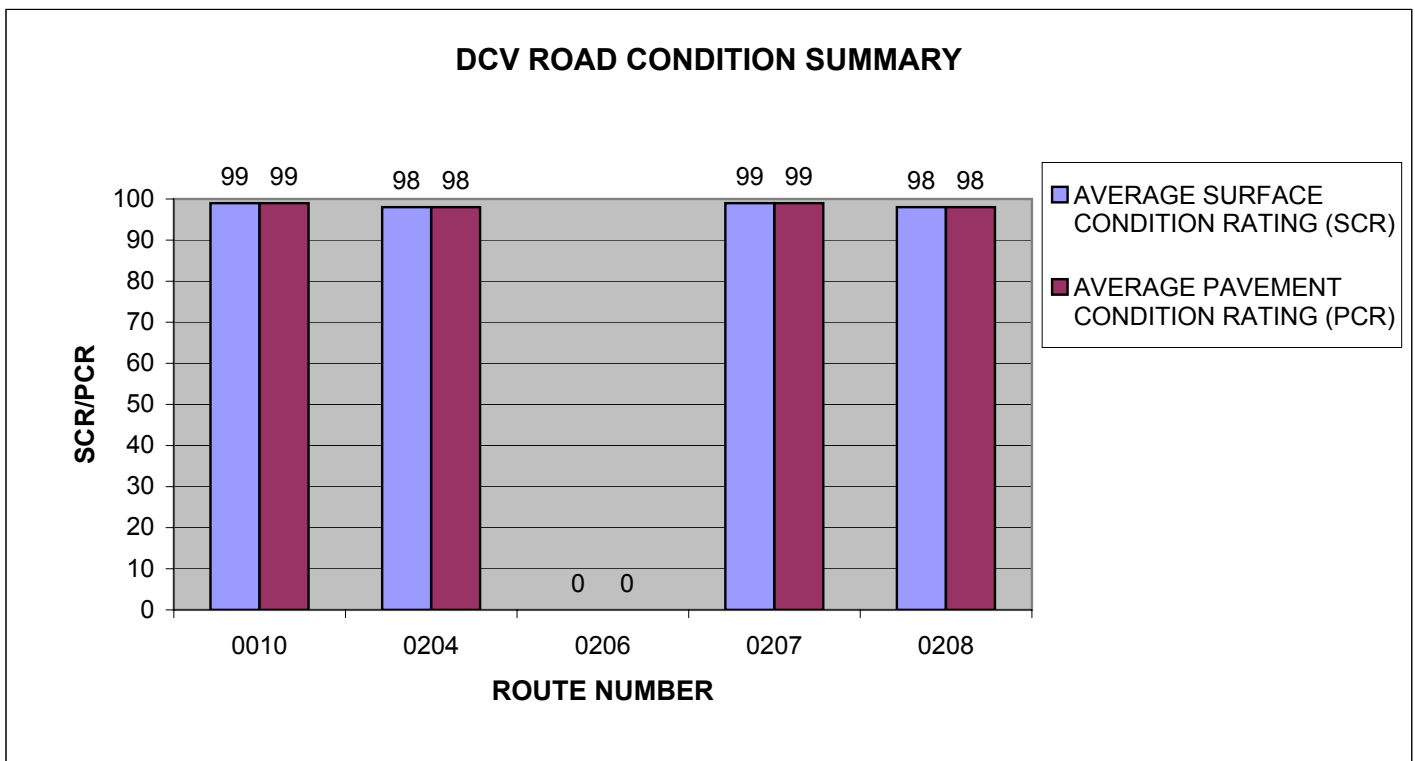
Condition Categories and Treatments



LAVO: DCV ROAD CONDITION SUMMARY

DCV - Data Collection Vehicle

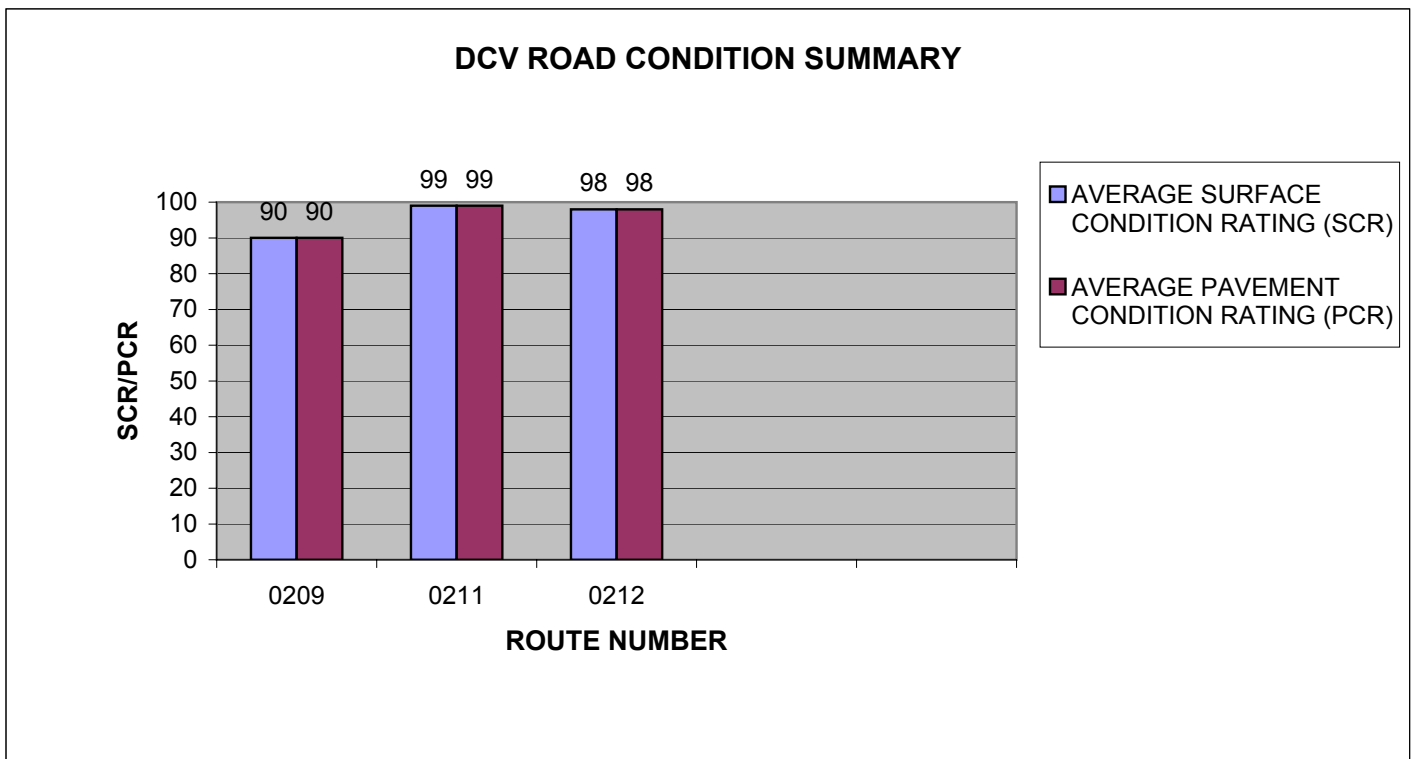
ROUTE NUMBER	ROUTE NAME	FUNCT CLASS	ROUTE LENGTH	SURFACE TYPE	AVERAGE SURFACE CONDITION RATING (SCR)	AVERAGE PAVEMENT CONDITION RATING (PCR)
0010	LASSEN PARK ROAD	1	29.76	ASPHALT	99	99
0204	MANZANITA CAMPGROUND ACCESS ROAD	2	0.87	ASPHALT	98	98
0206	MANZANITA LAKE ACCESS ROAD	2	0.15	ASPHALT	0	0
0207	CRAGS CAMPGROUND	2	0.30	ASPHALT	99	99
0208	LOST CREEK CAMPGROUND	2	0.29	ASPHALT	98	98



LAVO: DCV ROAD CONDITION SUMMARY

DCV - Data Collection Vehicle

ROUTE NUMBER	ROUTE NAME	FUNCT CLASS	ROUTE LENGTH	SURFACE TYPE	AVERAGE SURFACE CONDITION RATING (SCR)	AVERAGE PAVEMENT CONDITION RATING (PCR)
0209	SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD	2	0.10	ASPHALT	90	90
0211	SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE ROAD	2	0.10	ASPHALT	99	99
0212	KINGS CREEK PICNIC AREA ROAD	2	0.39	ASPHALT	98	98



Section 4

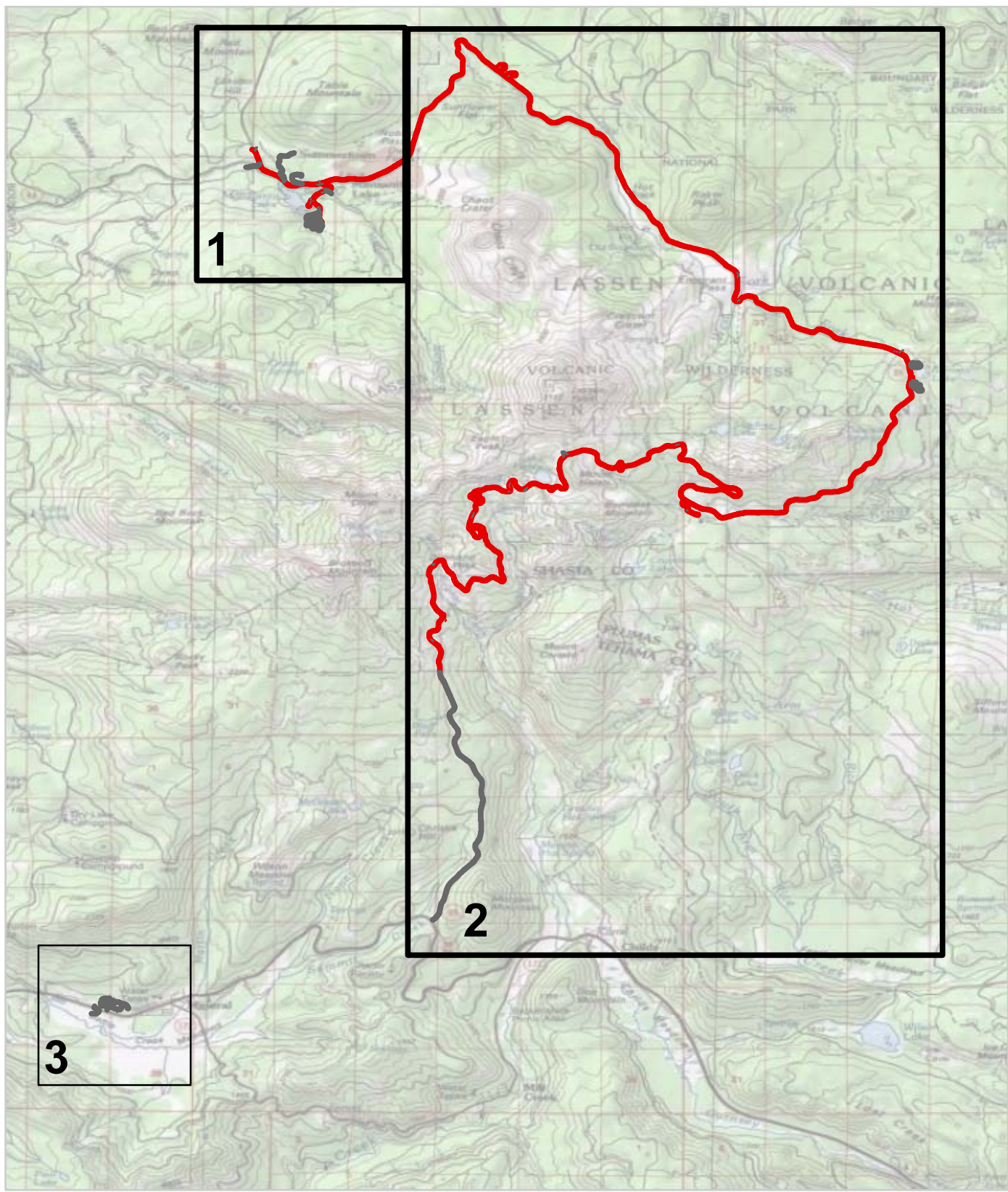
Park Route Location Maps



Lassen Volcanic National Park



Lassen Volcanic National Park Route Location Map Key Map



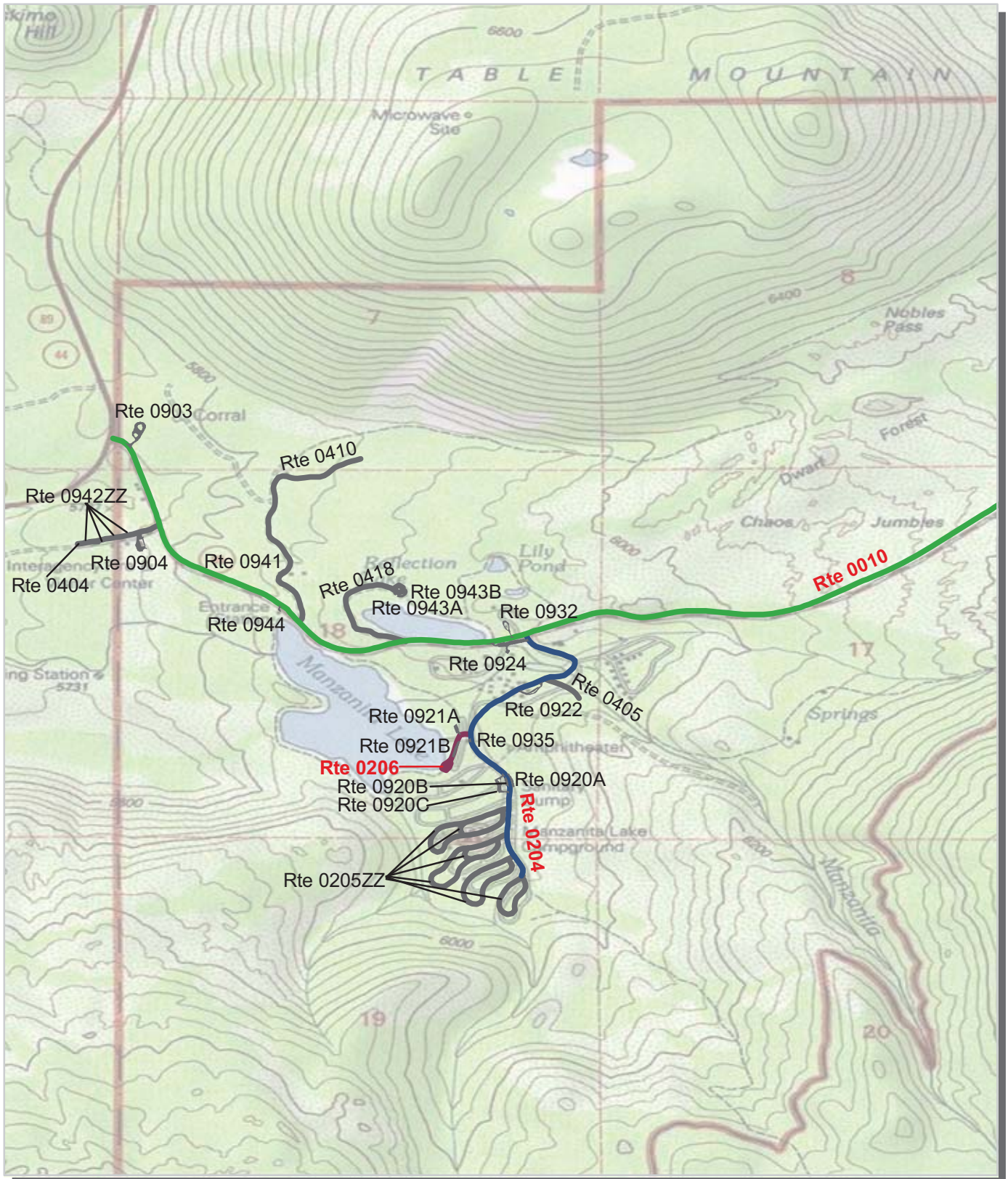
— Cycle 5 Collected Routes
— Routes Collected in Previous Cycle



Lassen Volcanic National Park

Route Location Map

Area 1



Unique colors used to differentiate routes

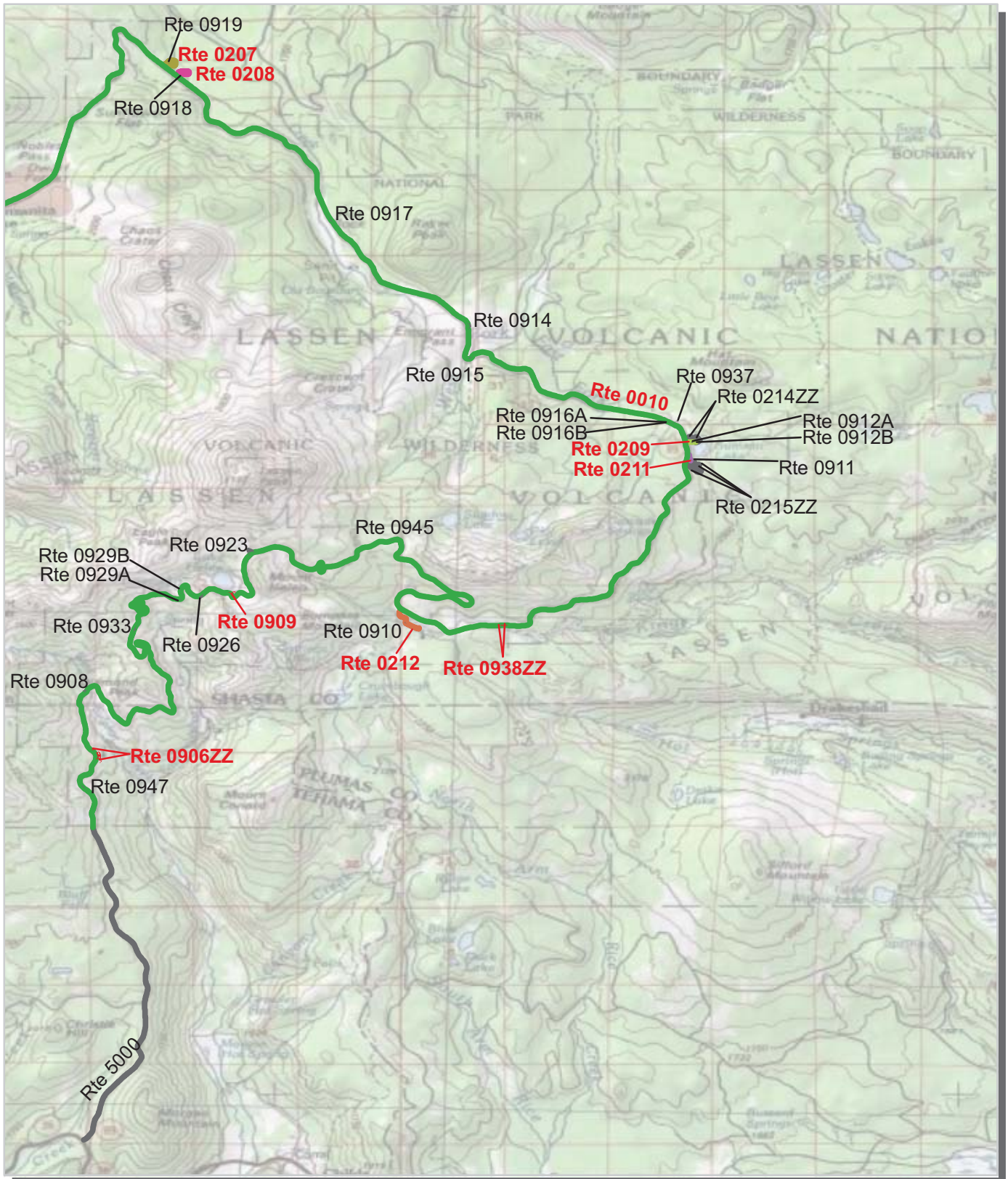
— Routes Collected in Previous Cycle



Lassen Volcanic National Park

Route Location Map

Area 2



Unique colors used to differentiate routes

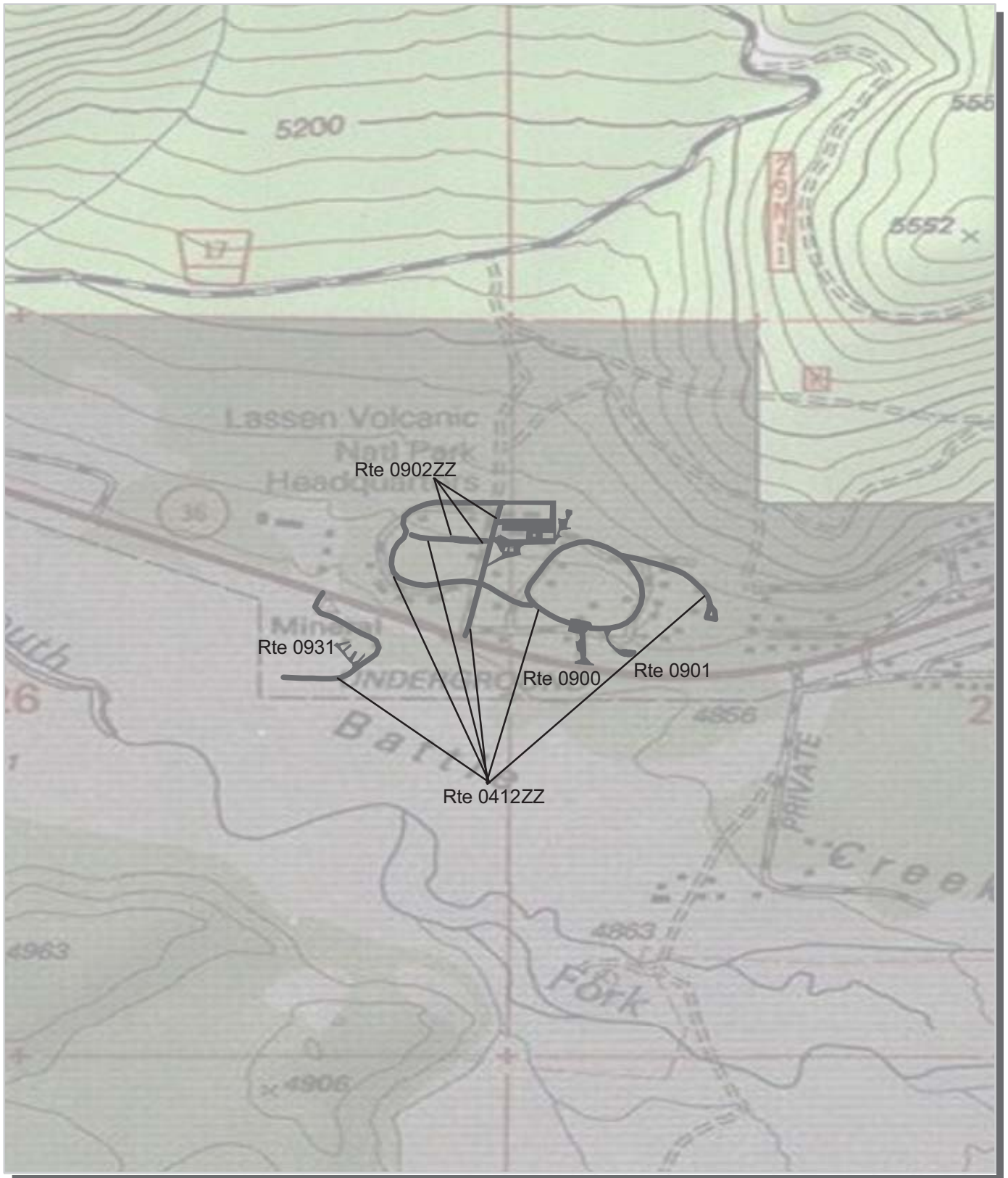
— Routes Collected in Previous Cycle



Lassen Volcanic National Park

Route Location Map

Area 3



Unique colors used to differentiate routes

— Routes Collected in Previous Cycle

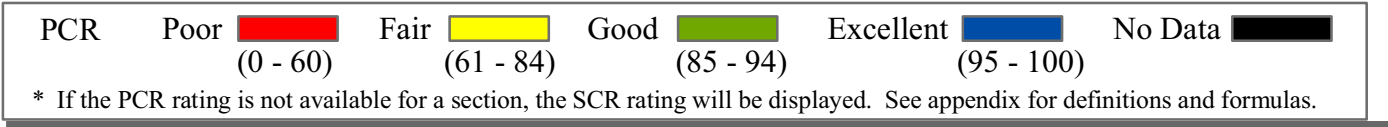
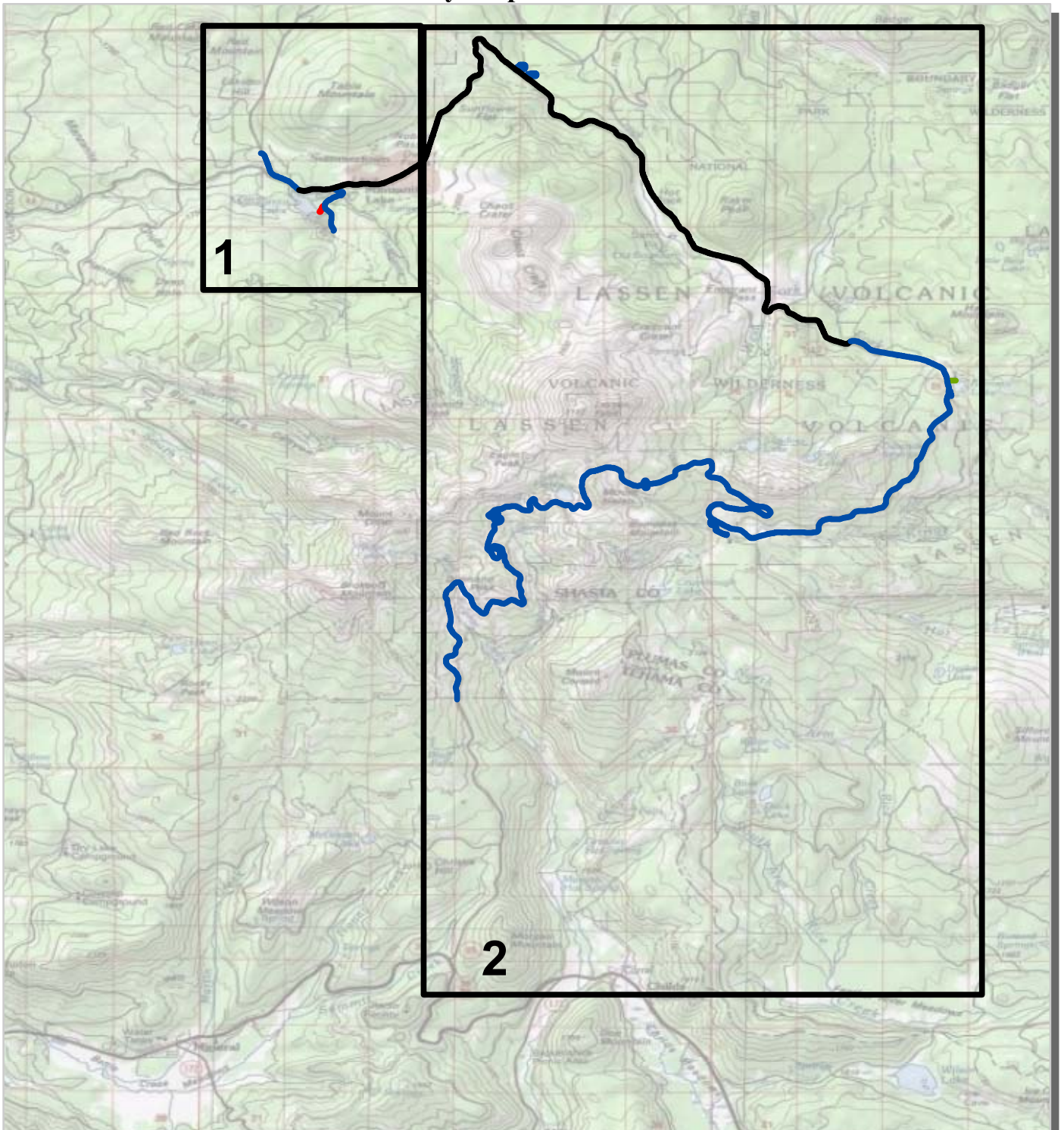


Lassen Volcanic National Park

Route Condition Map

PCR - Mile by Mile

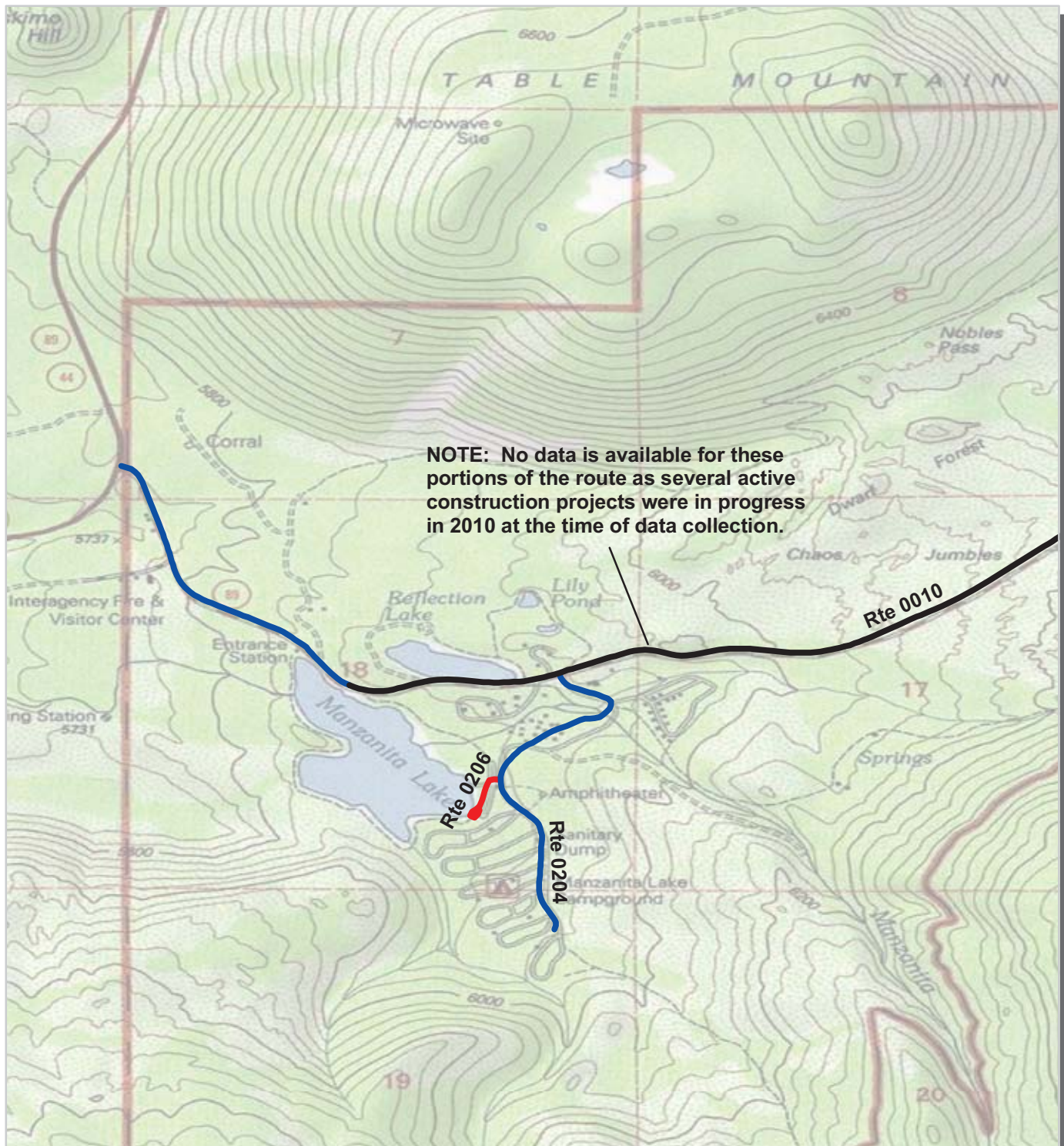
Key Map



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



Lassen Volcanic National Park
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.

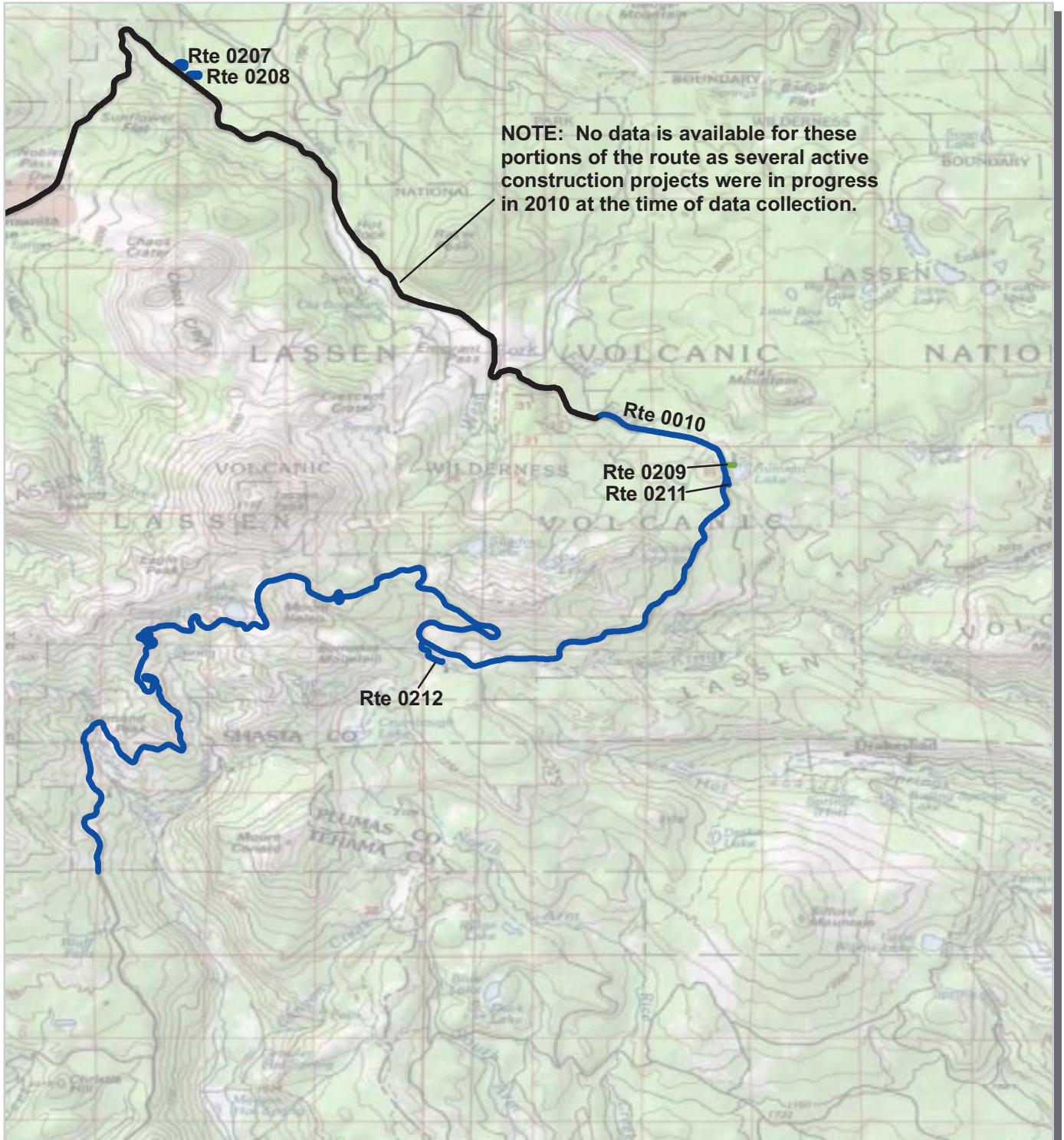


Lassen Volcanic National Park

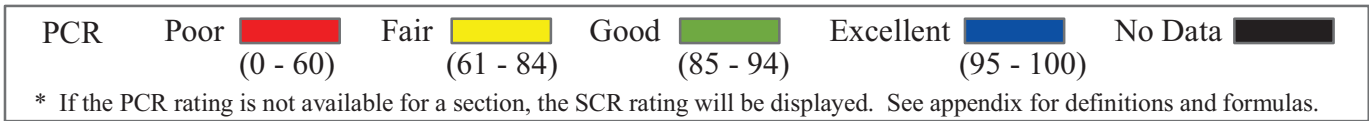
Route Condition Map

PCR - Mile by Mile

Area 2



NOTE: No data is available for these portions of the route as several active construction projects were in progress in 2010 at the time of data collection.

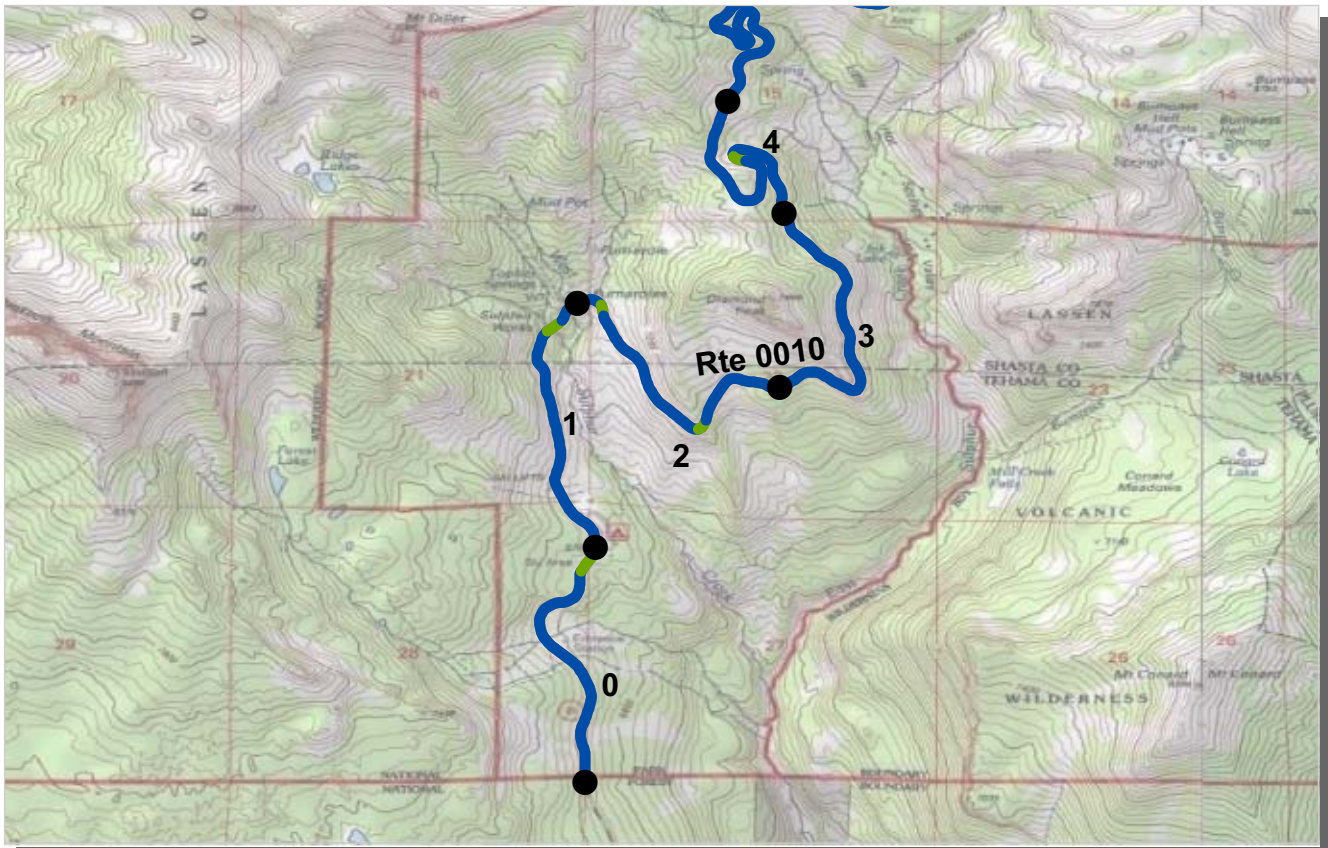


Section 5 Paved Route Condition Rating Sheets



Lassen Volcanic National Park





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 LASSEN PARK ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/15/2010
TOTAL LENGTH: 29.76 Miles

PACIFIC WEST REGION

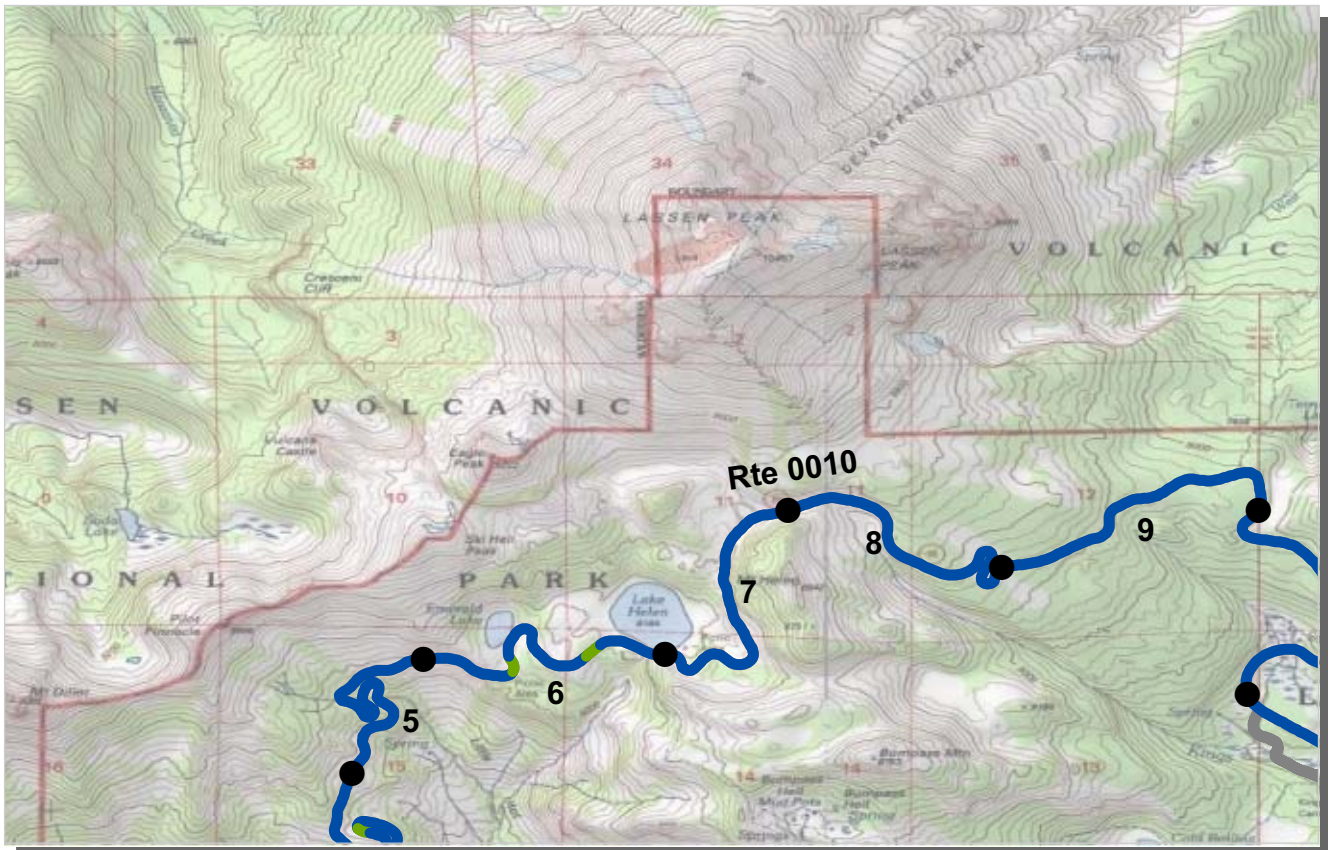
<i>Section Number</i>	0	1	2	3	4
<i>Section Length (mi)</i>	1.00	1.00	1.00	1.00	1.00
<i>Cross Section Information</i>					
Number of Lanes	2	2	2	2	2
Paved Width (ft)	28	25	23	24	23
Lane Width (ft)	11	11	10	10	10
<i>Roadway Condition Information</i>					
SCR (Surface Condition Rating)	98	99	99	99	100
PCR (Pavement Condition Rating)	99	99	99	99	100
<i>Distress Index Values</i>					
Structural Crack Index	100	100	100	100	100
Transverse Cracking Index	100	100	100	100	100
Patching Index	100	100	100	100	100
Rutting Index	98	99	99	99	100
Roughness Condition Index (RCI)	100	100	100	100	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 - Non Applicable

ROUTE: 0010 LASSEN PARK 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: 0010 LASSEN PARK ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/15/2010
TOTAL LENGTH: 29.76 Miles

PACIFIC WEST REGION

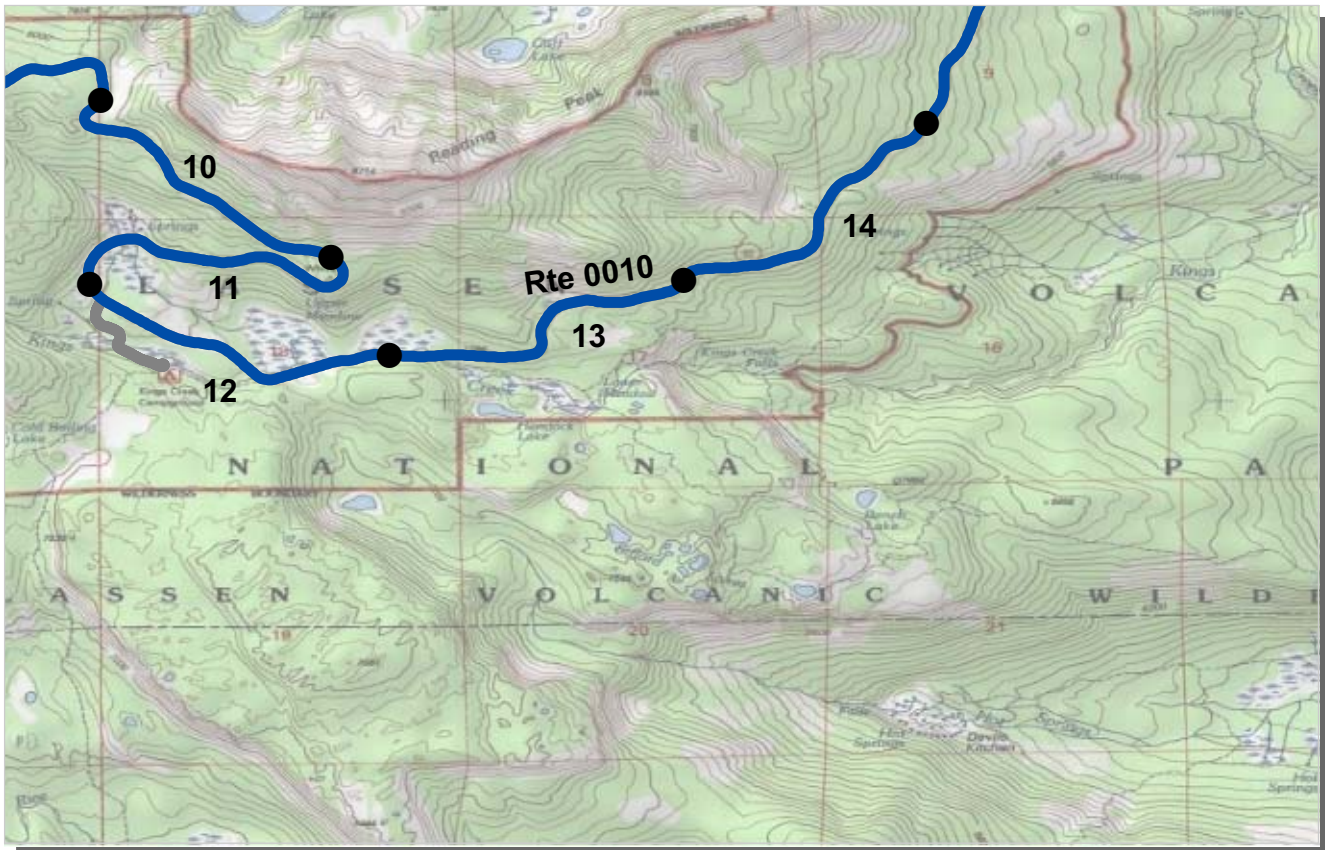
<i>Section Number</i>	5	6	7	8	9
<i>Section Length (mi)</i>	1.00	1.00	1.00	1.00	1.00
<i>Cross Section Information</i>					
Number of Lanes	2	2	2	2	2
Paved Width (ft)	23	25	24	24	24
Lane Width (ft)	10	11	11	11	11
<i>Roadway Condition Information</i>					
SCR (Surface Condition Rating)	100	99	99	99	99
PCR (Pavement Condition Rating)	100	99	99	99	99
<i>Distress Index Values</i>					
Structural Crack Index	100	100	100	100	100
Transverse Cracking Index	100	100	100	100	100
Patching Index	100	100	100	100	100
Rutting Index	100	99	99	99	99
Roughness Condition Index (RCI)	100	100	100	100	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 - Non Applicable

ROUTE: 0010 LASSEN PARK 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: 0010 LASSEN PARK ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/15/2010
TOTAL LENGTH: 29.76 Miles

PACIFIC WEST REGION

<i>Section Number</i>	10	11	12	13	14
<i>Section Length (mi)</i>	1.00	1.00	1.00	1.00	1.00
<i>Cross Section Information</i>					
Number of Lanes	2	2	2	2	2
Paved Width (ft)	24	23	23	24	24
Lane Width (ft)	11	11	11	11	11
<i>Roadway Condition Information</i>					
SCR (Surface Condition Rating)	99	99	100	100	100
PCR (Pavement Condition Rating)	99	99	100	100	100
<i>Distress Index Values</i>					
Structural Crack Index	100	100	100	100	100
Transverse Cracking Index	100	100	100	100	100
Patching Index	100	100	100	100	100
Rutting Index	99	99	100	100	100
Roughness Condition Index (RCI)	100	100	100	100	100

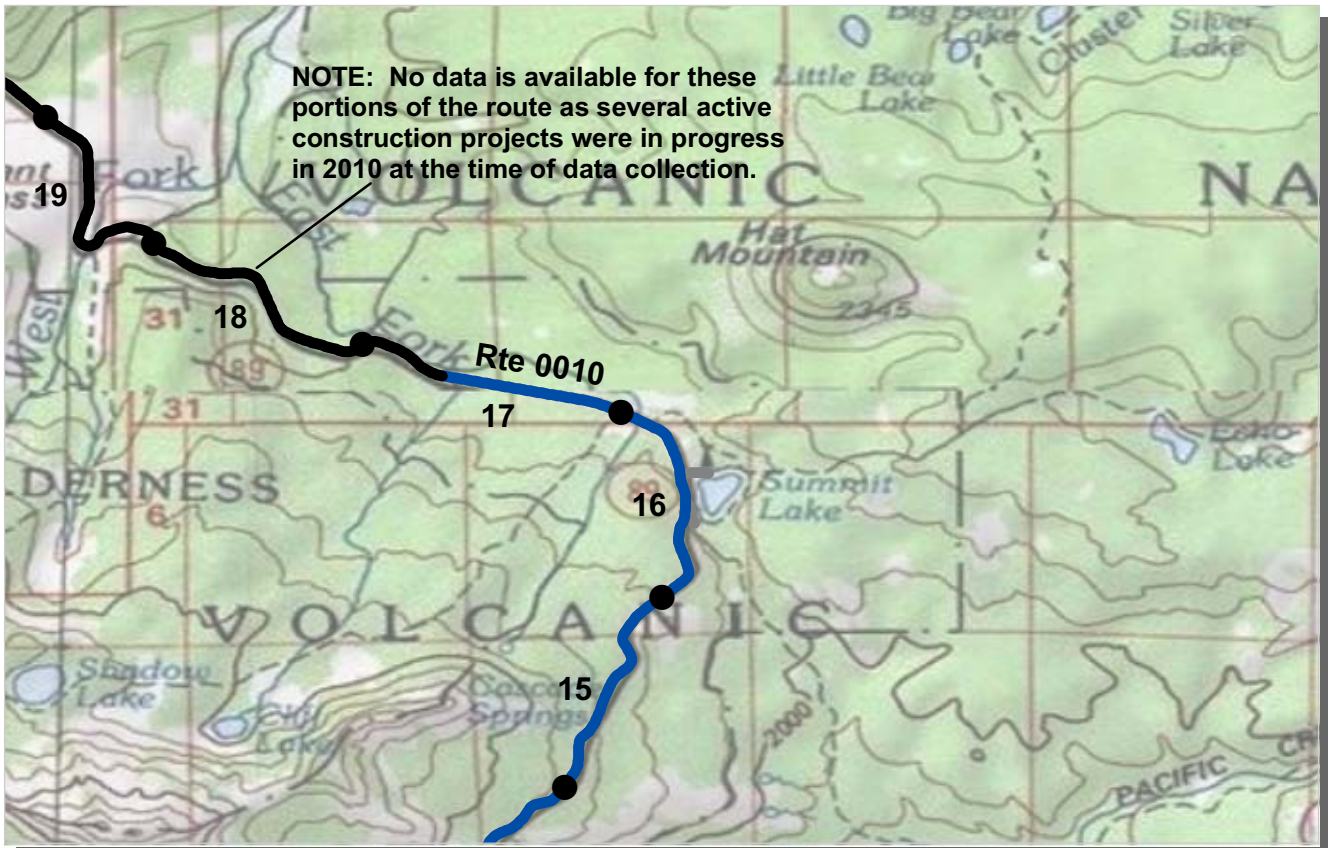
NOTES:

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 - Non Applicable



ROUTE: 0010 LASSEN PARK 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: 0010 LASSEN PARK ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/15/2010
TOTAL LENGTH: 29.76 Miles

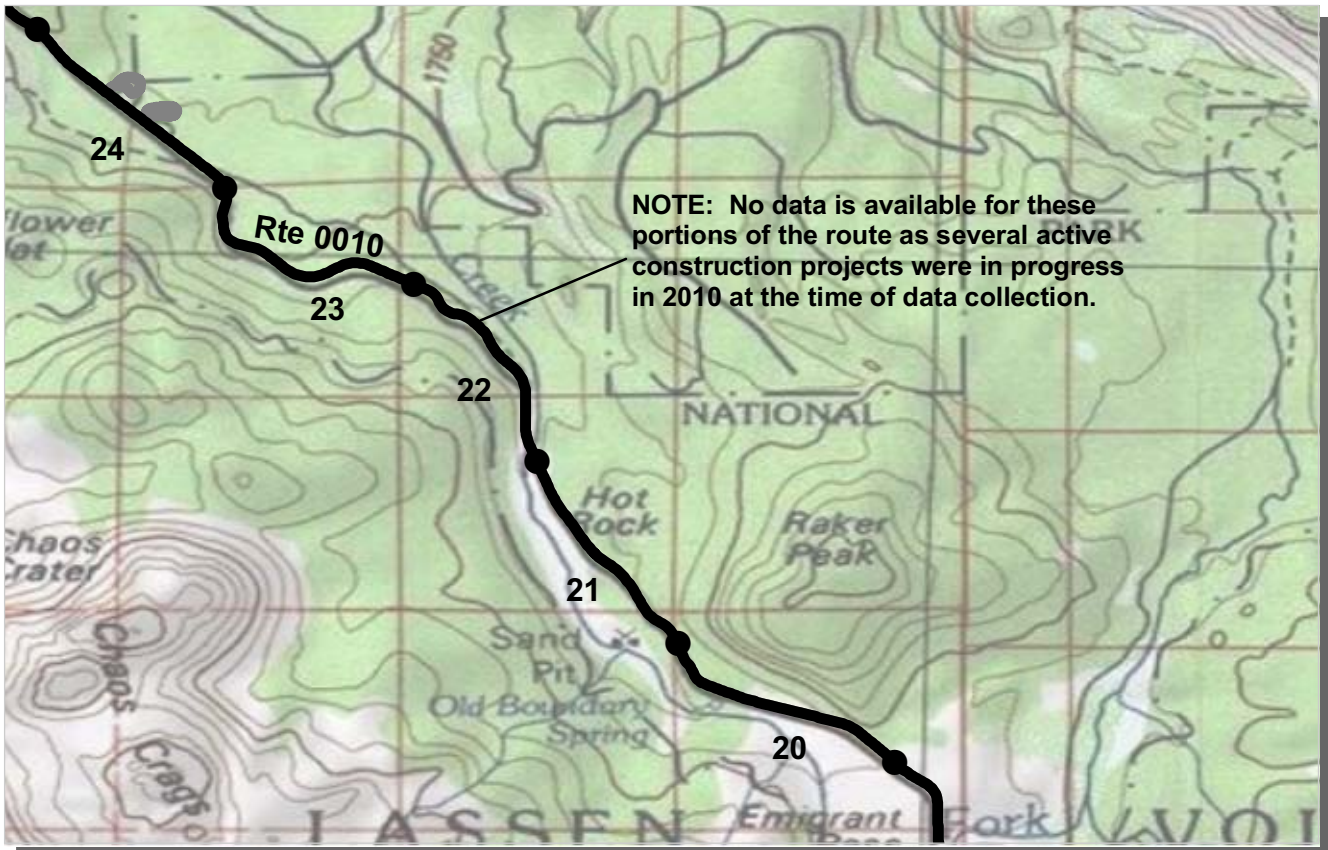
PACIFIC WEST REGION

<i>Section Number</i>	15	16	17	18	19
<i>Section Length (mi)</i>	1.00	1.00	1.00	1.00	1.00
<i>Cross Section Information</i>					
Number of Lanes	2	2	2	2	2
Paved Width (ft)	24	23	22	21	22
Lane Width (ft)	11	11	10	9	9
<i>Roadway Condition Information</i>					
SCR (Surface Condition Rating)	100	100	100	NC	NC
PCR (Pavement Condition Rating)	100	100	100	NC	NC
<i>Distress Index Values</i>					
Structural Crack Index	100	100	100	NC	NC
Transverse Cracking Index	100	100	100	NC	NC
Patching Index	100	100	100	NC	NC
Rutting Index	100	100	100	NC	NC
Roughness Condition Index (RCI)	100	100	100	NC	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 - Non Applicable



ROUTE: 0010 LASSEN PARK 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: 0010 LASSEN PARK ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

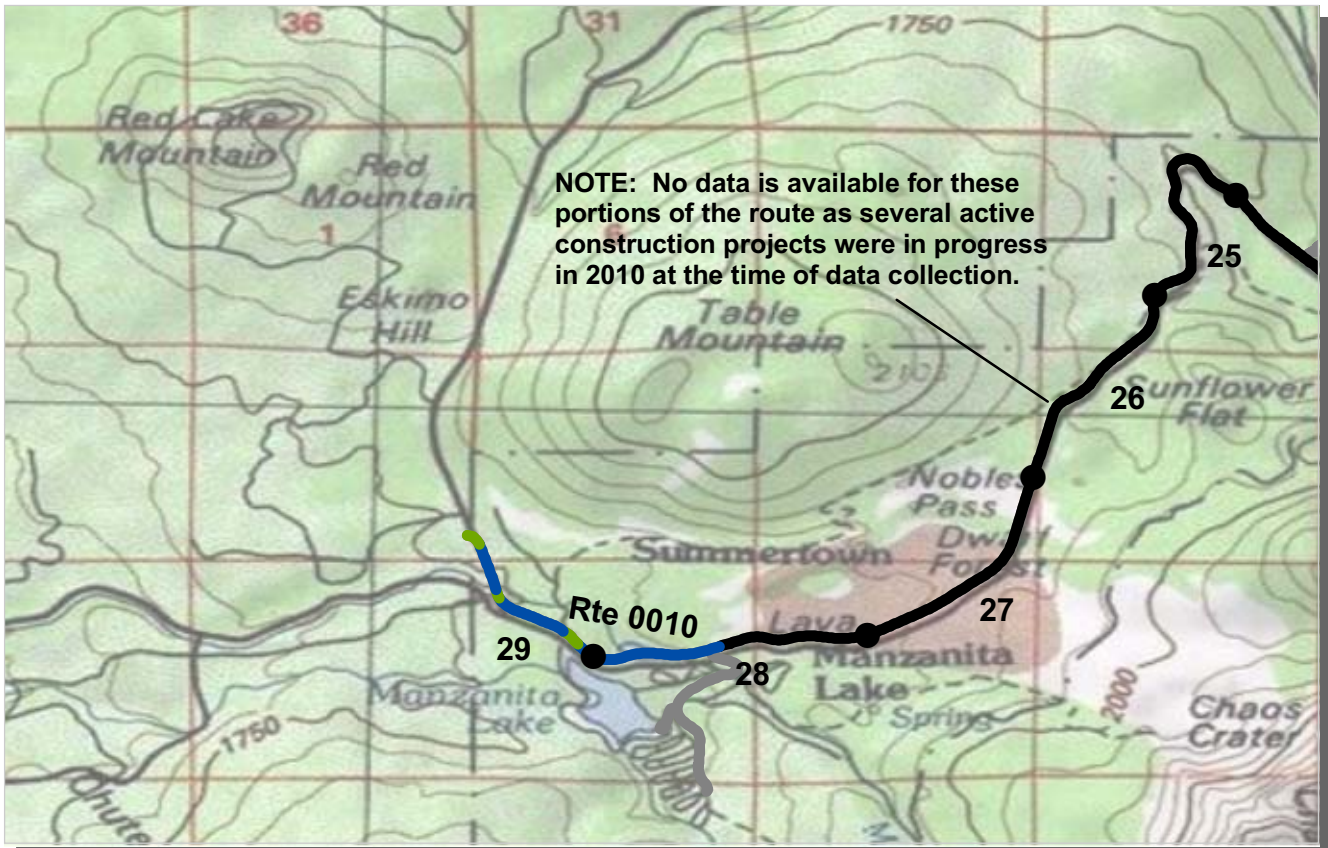
COLLECTED: 8/15/2010
TOTAL LENGTH: 29.76 Miles

PACIFIC WEST REGION

Section Number	20	21	22	23	24
Section Length (mi)	1.00	1.00	1.00	1.00	1.00
Cross Section Information					
Number of Lanes	2	2	2	2	2
Paved Width (ft)	21	21	21	21	21
Lane Width (ft)	9	9	9	9	9
Roadway Condition Information					
SCR (Surface Condition Rating)	NC	NC	NC	NC	NC
PCR (Pavement Condition Rating)	NC	NC	NC	NC	NC
Distress Index Values					
Structural Crack Index	NC	NC	NC	NC	NC
Transverse Cracking Index	NC	NC	NC	NC	NC
Patching Index	NC	NC	NC	NC	NC
Rutting Index	NC	NC	NC	NC	NC
Roughness Condition Index (RCI)	NC	NC	NC	NC	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 - Non Applicable

ROUTE: 0010 LASSEN PARK 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: 0010 LASSEN PARK ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/15/2010
TOTAL LENGTH: 29.76 Miles

PACIFIC WEST REGION

<i>Section Number</i>	25	26	27	28	29
<i>Section Length (mi)</i>	1.00	1.00	1.00	1.00	0.76
<i>Cross Section Information</i>					
Number of Lanes	2	2	2	2	2
Paved Width (ft)	21	22	23	24	27
Lane Width (ft)	9	9	9	11	12
<i>Roadway Condition Information</i>					
SCR (Surface Condition Rating)	NC	NC	NC	NC	98
PCR (Pavement Condition Rating)	NC	NC	NC	NC	98
<i>Distress Index Values</i>					
Structural Crack Index	NC	NC	NC	NC	98
Transverse Cracking Index	NC	NC	NC	NC	100
Patching Index	NC	NC	NC	NC	100
Rutting Index	NC	NC	NC	NC	99
Roughness Condition Index (RCI)	NC	NC	NC	NC	99

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 - Non Applicable



ROUTE: 0010 LASSEN PARK 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: 0204 MANZANITA CAMPGROUND ACCESS ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/14/2010
TOTAL LENGTH: 0.87 Miles

PACIFIC WEST REGION

Section Number	0				
Section Length (mi)	0.87				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	25				
Lane Width (ft)	12				
Roadway Condition Information					
SCR (Surface Condition Rating)	98				
PCR (Pavement Condition Rating)	98				
Distress Index Values					
Structural Crack Index	100				
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 - Non Applicable



ROUTE: 0204 MANZANITA CAMPGROUND ACCESS 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: 0206 MANZANITA LAKE ACCESS ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/14/2010
TOTAL LENGTH: 0.15 Miles

PACIFIC WEST REGION

Section Number	0				
Section Length (mi)	0.15				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	16				
Lane Width (ft)	8				
Roadway Condition Information					
SCR (Surface Condition Rating)	0				
PCR (Pavement Condition Rating)	0				
Distress Index Values					
Structural Crack Index	0				
Transverse Cracking Index	99				
Patching Index	100				
Rutting Index	92				
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 - Non Applicable



ROUTE: 0206 MANZANITA LAKE ACCESS 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: 0207 CRAGS CAMPGROUND
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/14/2010
TOTAL LENGTH: 0.30 Miles

PACIFIC WEST REGION

Section Number	0				
Section Length (mi)	0.30				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	19				
Lane Width (ft)	10				
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)	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 - Non Applicable



ROUTE: 0207 CRAGS CAMPGROUND



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: 0208 LOST CREEK CAMPGROUND
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/14/2010
TOTAL LENGTH: 0.29 Miles

PACIFIC WEST REGION

Section Number	0				
Section Length (mi)	0.29				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	19				
Lane Width (ft)	10				
Roadway Condition Information					
SCR (Surface Condition Rating)	98				
PCR (Pavement Condition Rating)	98				
Distress Index Values					
Structural Crack Index	100				
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 - Non Applicable



ROUTE: 0208 LOST CREEK CAMPGROUND



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: 0209 SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/14/2010
TOTAL LENGTH: 0.10 Miles

PACIFIC WEST REGION

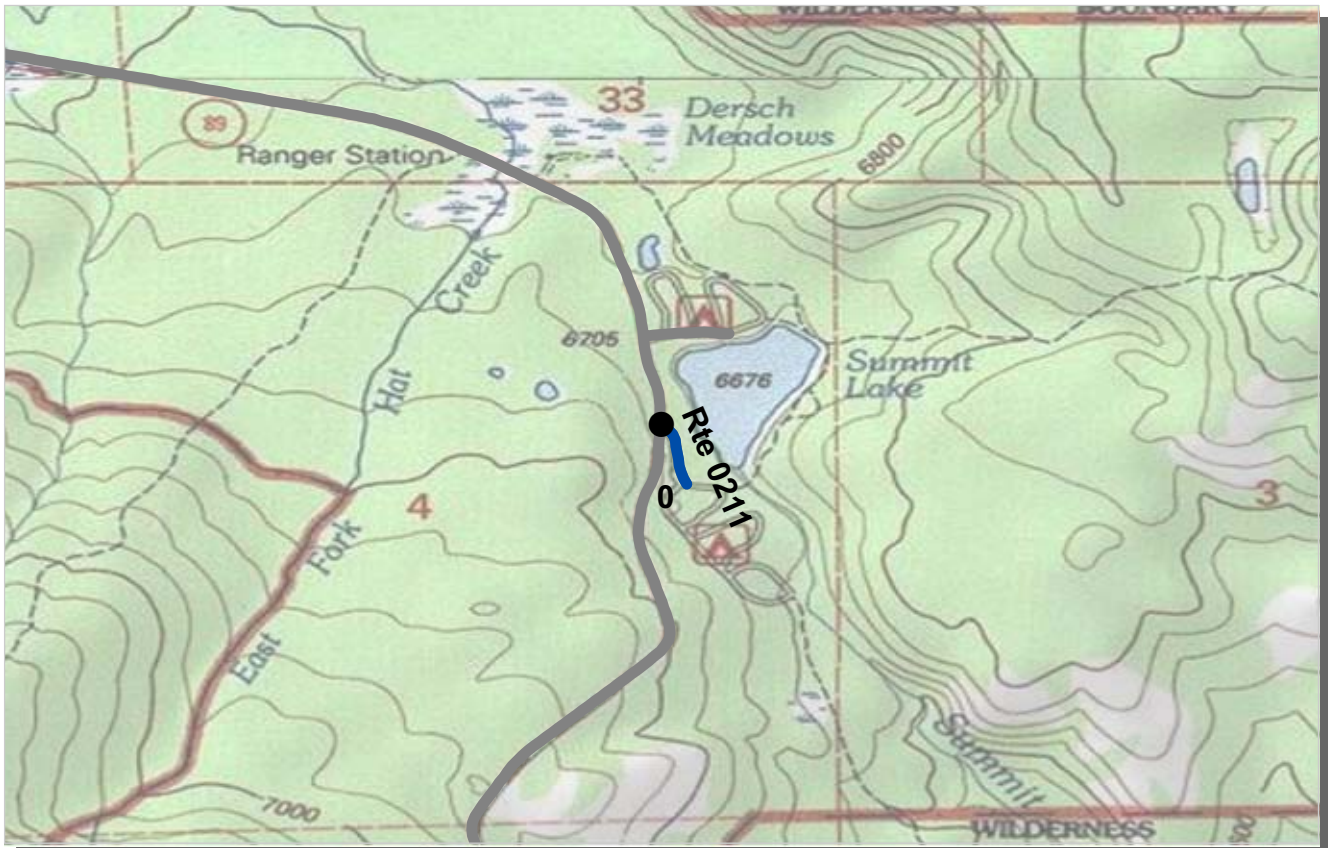
Section Number	0				
Section Length (mi)	0.10				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	18				
Lane Width (ft)	9				
Roadway Condition Information					
SCR (Surface Condition Rating)	90				
PCR (Pavement Condition Rating)	90				
Distress Index Values					
Structural Crack Index	100				
Transverse Cracking Index	99				
Patching Index	100				
Rutting Index	90				
Roughness Condition Index (RCI)	NC				

ROUTE: 0209 SUMMIT LAKE NORTH CAMPGROUND ENTRANCE ROAD

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 - Non Applicable



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: 0211 SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/14/2010
TOTAL LENGTH: 0.10 Miles

PACIFIC WEST REGION

Section Number	0				
Section Length (mi)	0.10				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	16				
Lane Width (ft)	8				
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)	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 - Non Applicable

ROUTE: 0211 SUMMIT LAKE SOUTH CAMPGROUND ENTRANCE 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: 0212 KINGS CREEK PICNIC AREA ROAD
LAVO : LASSEN VOLCANIC NATIONAL PARK

COLLECTED: 8/14/2010
TOTAL LENGTH: 0.39 Miles

PACIFIC WEST REGION

Section Number	0				
Section Length (mi)	0.39				
Cross Section Information					
Number of Lanes	2				
Paved Width (ft)	18				
Lane Width (ft)	9				
Roadway Condition Information					
SCR (Surface Condition Rating)	98				
PCR (Pavement Condition Rating)	98				
Distress Index Values					
Structural Crack Index	100				
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 - Non Applicable

ROUTE: 0212 KINGS CREEK PICNIC AREA ROAD

Section 6
Manually Rated Paved Route
Condition Rating Sheets



Lassen Volcanic National Park



MANUALLY RATED ROUTE CONDITION RATING SHEETS

This park is classified as a Large Park. Therefore, in Cycle 5, no manually rated routes were collected unless the route was previously uncollected by RIP.

Section 7 Parking Area Condition Rating Sheets



Lassen Volcanic National Park



Federal Lands Highway
Road Inventory Program

LASSEN VOLCANIC NATIONAL PARK

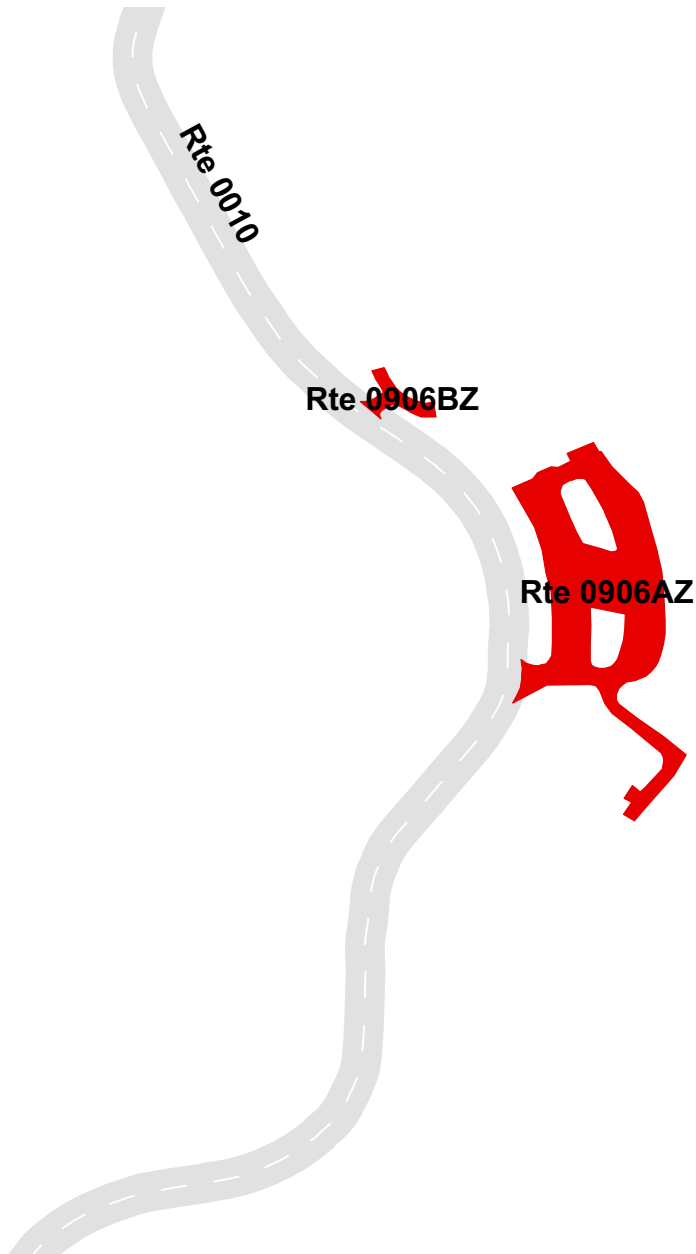
Route 0906ZZ

SOUTHWEST VISITORS CENTER PARKING AREAS
 FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.0 (ON RIGHT)
 TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.12 (ON RIGHT)

Summary Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0906ZZ	PUBLIC	8/15/2010	87,586	1.51	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
2	2	0	CONCRETE CURB AND GUTTER	NO CURB	SUMMARY/90

* Lane miles are based on 11' lane widths



LASSEN VOLCANIC NATIONAL PARK

Route 0906AZ

SOUTHWEST VISITORS CENTER PARKING

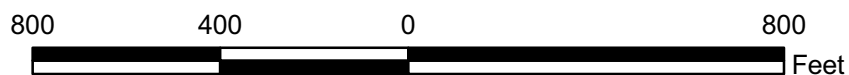
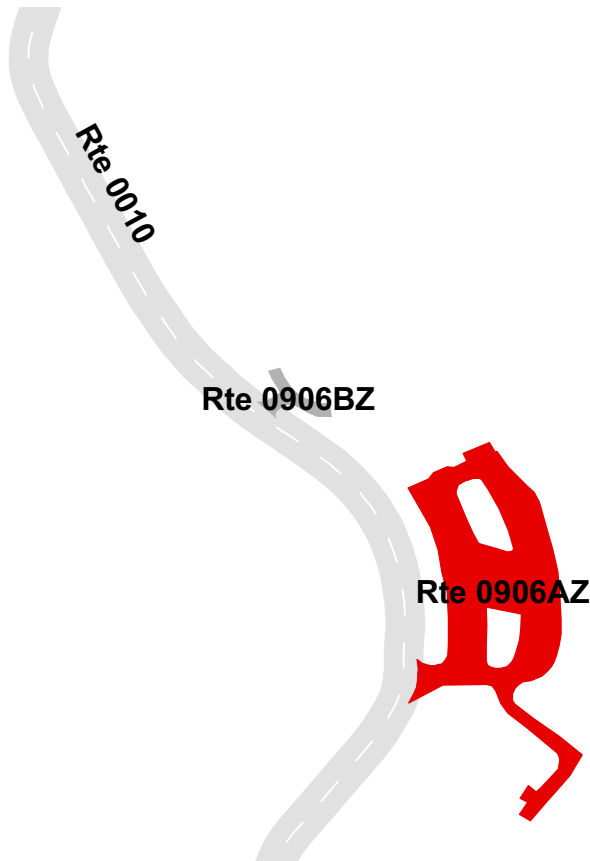
FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 0.99 (ON RIGHT)

TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 1.12 (ON RIGHT)

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0906AZ	PUBLIC	8/15/2010	83,118	1.43	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
2	2	0	CONCRETE CURB AND GUTTER	NO CURB	GOOD/90

* Lane miles are based on 11' lane widths



LASSEN VOLCANIC NATIONAL PARK

Route 0906BZ

SERVICE ENTRY PARKING

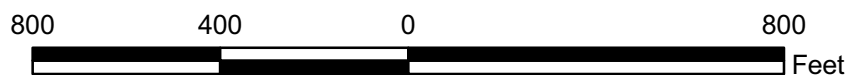
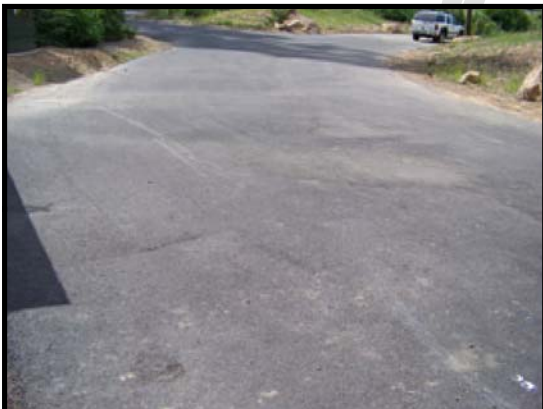
FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP1.09 (ON RIGHT)

TO PARKING

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0906BZ	PUBLIC	8/15/2010	4,468	0.08	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	CONCRETE CURB AND GUTTER	NO CURB	GOOD/90

* Lane miles are based on 11' lane widths



LASSEN VOLCANIC NATIONAL PARK

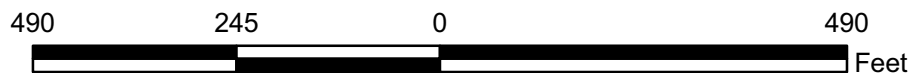
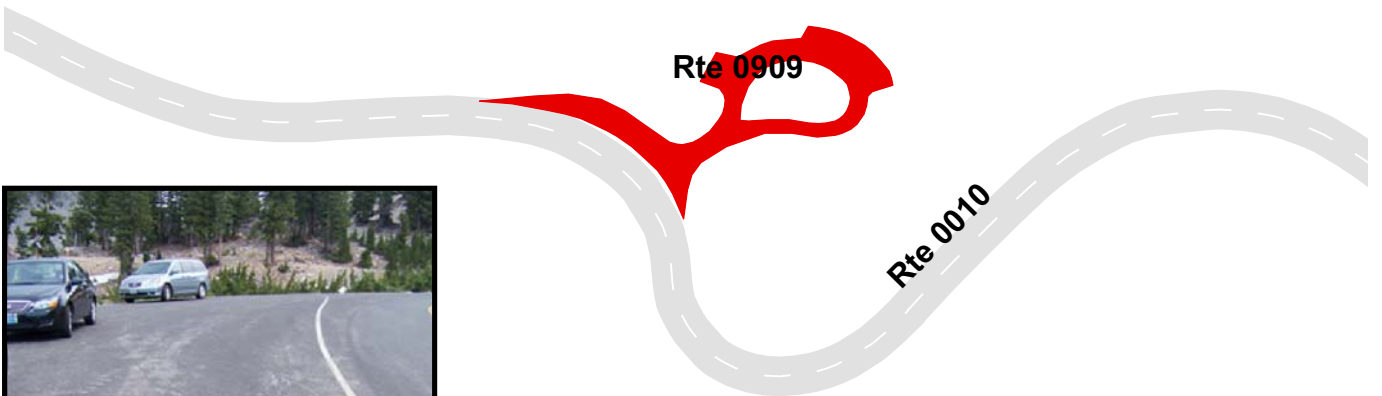
Route 0909

LAKE HELEN PICNIC AREA LOOP

ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD) AT MP 7.03 (ON LEFT)

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0909	PUBLIC	8/15/2010	16,851	0.29	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	EXCELLENT/97

* Lane miles are based on 11' lane widths

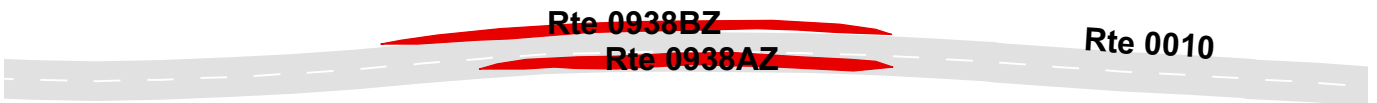


LASSEN VOLCANIC NATIONAL PARK
Route 0938ZZ
 KINGS CREEK TRAILHEAD PARKING AREAS
 ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)

Summary Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0938ZZ	PUBLIC	8/15/2010	7,582	0.13	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	1	0	CONCRETE CURB AND GUTTER	NO CURB	SUMMARY/97

* Lane miles are based on 11' lane widths



LASSEN VOLCANIC NATIONAL PARK

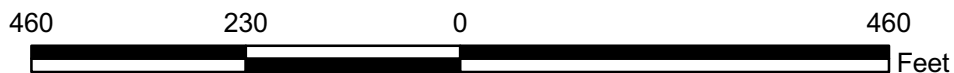
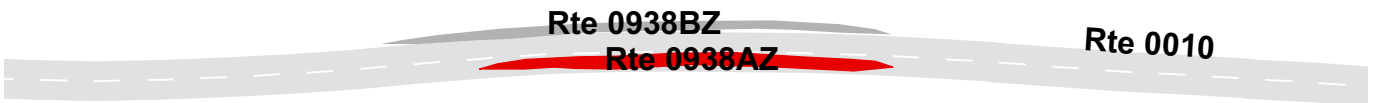
Route 0938AZ

KINGS CREEK TRAILHEAD PARKING A
ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0938AZ	PUBLIC	8/15/2010	3,821	0.07	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	1	0	CONCRETE CURB AND GUTTER	NO CURB	EXCELLENT/97

* Lane miles are based on 11' lane widths



LASSEN VOLCANIC NATIONAL PARK

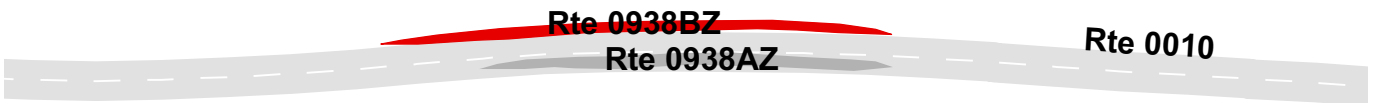
Route 0938BZ

KINGS CREEK TRAILHEAD PARKING B
ADJACENT TO ROUTE 0010 (LASSEN PARK ROAD)

Subcomponent Record

Route Number	Public / NonPublic	Date Visited	Area (sq ft)	Lane Miles *	Surface Type
0938BZ	PUBLIC	8/15/2010	3,761	0.07	AS
Culverts	Drop Inlets	Gates	Curb & Gutter	Curb	PCR
0	0	0	NO CURB AND GUTTER	NO CURB	EXCELLENT/97

* Lane miles are based on 11' lane widths



Section 8

Route Maintenance Features Summaries



Lassen Volcanic National Park



Federal Lands Highway
Road Inventory Program

LAVO: DCV ROUTE MAINTENANCE FEATURES SUMMARY

FEATURE	ROUTE 0207 CRAGS CAMPGROUND	ROUTE 0208 LOST CREEK CAMPGROUND						UNIT
BARRIER	603	0						LINEAR FEET
BOLLARD	137	0						LINEAR FEET
BRIDGE	0	0						EACH
CABLE	0	0						LINEAR FEET
CATTLE GUARD	0	0						EACH
CULVERT	0	0						EACH
CURB	0	0						LINEAR FEET
DROP INLET	0	0						EACH
GATE	1	1						EACH
GUARD/GUIDE RAIL	0	0						LINEAR FEET
GUARD/GUIDE WALL	603	0						LINEAR FEET
INTERSECTION	6	6						EACH
LOW WATER CROSSING	0	0						EACH
LOW WATER CROSSING	0	0						LINEAR FEET
MILE MARKER	0	0						EACH
OVERHEAD SIGN	0	0						EACH
OVERPASS	0	0						EACH
PARK BOUNDARY	0	0						EACH
PAVED DITCH	0	0						LINEAR FEET
PULLOUT	0	0						EACH
PULLOUT	0	0						LINEAR FEET
RAILROAD CROSSING	0	0						EACH
RETAINING WALL	0	0						EACH
RETAINING WALL	0	0						LINEAR FEET
SIGN	4	3						EACH
STATE BOUNDARY	0	0						EACH
TEMPORARY BARRIER	0	0						LINEAR FEET
TRAFFIC LIGHT	0	0						EACH
TUNNEL	0	0						EACH
TUNNEL	0	0	0	0	0	0	0	LINEAR FEET

Notice: Culverts and drop inlets were NOT marked by NPS in Cycle 5 along new or re-aligned DCV driven routes.

STRUCTURE LIST

No data available for this section.

Section 9
Route Maintenance Features
Road Logs



Lassen Volcanic National Park



LAVO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0207: CRAGS CAMPGROUND

Notice: Culverts and drop inlets were NOT marked by NPS nor inventoried by RIP in Cycle 5 on any new or re-aligned DCV driven routes. Therefore no culverts or drop inlets are reported in Section 9, unless a culvert has a BIP structure number attached to it.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.000	0.000	ROUTE BEGIN	N/A	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 24.62
0.000	0.000	INTERSECTION	RIGHT	ROUTE 0010 (LASSEN PARK ROAD)
0.000	0.000	SIGN	N/A	WARNING, UNABLE TO READ FROM VIDEO
0.000	0.000	INTERSECTION	LEFT	ROUTE 0010 (LASSEN PARK ROAD)
0.004	0.004	SIGN	LEFT	REGULATORY, STOP
0.006	0.006	GATE	N/A	N/A
0.007	0.007	SIGN	RIGHT	REGULATORY, UNABLE TO READ FROM VIDEO
0.028	0.028	SIGN	RIGHT	REGULATORY, SPEED LIMIT 15
0.032	0.058	GUARD/GUIDE WALL	RIGHT	N/A
0.033	0.045	GUARD/GUIDE WALL	LEFT	N/A
0.054	0.054	INTERSECTION	LEFT	ROUTE 0207 (CRAGS CAMPGROUND)
0.069	0.069	INTERSECTION	RIGHT	ROUTE 0919 (CRAGS PARKING)
0.082	0.103	GUARD/GUIDE WALL	RIGHT	N/A
0.084	0.088	GUARD/GUIDE WALL	LEFT	N/A
0.104	0.105	GUARD/GUIDE WALL	LEFT	N/A
0.120	0.124	GUARD/GUIDE WALL	LEFT	N/A
0.134	0.144	GUARD/GUIDE WALL	LEFT	N/A
0.137	0.139	GUARD/GUIDE WALL	RIGHT	N/A
0.148	0.149	GUARD/GUIDE WALL	RIGHT	N/A
0.168	0.173	GUARD/GUIDE WALL	RIGHT	N/A
0.183	0.185	GUARD/GUIDE WALL	LEFT	N/A
0.213	0.215	GUARD/GUIDE WALL	RIGHT	N/A
0.226	0.231	GUARD/GUIDE WALL	RIGHT	N/A
0.259	0.261	GUARD/GUIDE WALL	LEFT	N/A
0.266	0.273	GUARD/GUIDE WALL	RIGHT	N/A
0.276	0.278	GUARD/GUIDE WALL	RIGHT	N/A
0.284	0.290	GUARD/GUIDE WALL	RIGHT	N/A
0.295	0.297	GUARD/GUIDE WALL	RIGHT	N/A
0.297	0.297	INTERSECTION	LEFT	ROUTE 0207 (CRAGS CAMPGROUND)
0.297	0.297	INTERSECTION	RIGHT	ROUTE 0207 (CRAGS CAMPGROUND)

LAVO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0207: CRAGS CAMPGROUND

Notice: Culverts and drop inlets were NOT marked by NPS nor inventoried by RIP in Cycle 5 on any new or re-aligned DCV driven routes. Therefore no culverts or drop inlets are reported in Section 9, unless a culvert has a BIP structure number attached to it.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.297	0.297	ROUTE END	N/A	TO END OF LOOP

LAVO: ROUTE MAINTENANCE FEATURES ROAD LOG

ROUTE 0208: LOST CREEK CAMPGROUND

Notice: Culverts and drop inlets were NOT marked by NPS nor inventoried by RIP in Cycle 5 on any new or re-aligned DCV driven routes. Therefore no culverts or drop inlets are reported in Section 9, unless a culvert has a BIP structure number attached to it.

FROM MILEPOST	TO MILEPOST	FEATURE	SIDE	COMMENT
0.000	0.000	ROUTE BEGIN	N/A	FROM ROUTE 0010 (LASSEN PARK ROAD) AT MP 24.42
0.000	0.000	INTERSECTION	LEFT	ROUTE 0010 (LASSEN PARK ROAD)
0.000	0.000	INTERSECTION	RIGHT	ROUTE 0010 (LASSEN PARK ROAD)
0.005	0.005	SIGN	LEFT	REGULATORY, STOP
0.014	0.014	GATE	N/A	N/A
0.015	0.015	SIGN	RIGHT	REGULATORY, UNABLE TO READ FROM VIDEO
0.025	0.025	INTERSECTION	LEFT	ROUTE 0208 (LOST CREEK CAMPGROUND)
0.032	0.032	INTERSECTION	RIGHT	ROUTE 0918 (LOST CREEK GROUP CAMP PARKING)
0.046	0.046	SIGN	RIGHT	GUIDE, VEHICLES STAY ON PAVED AREAS
0.292	0.292	INTERSECTION	LEFT	ROUTE 0208 (LOST CREEK CAMPGROUND)
0.292	0.292	INTERSECTION	RIGHT	ROUTE 0208 (LOST CREEK CAMPGROUND)
0.292	0.292	ROUTE END	N/A	TO END OF LOOP

Section 10 Appendix



Lassen Volcanic National Park



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 vis a vis 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 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. 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.

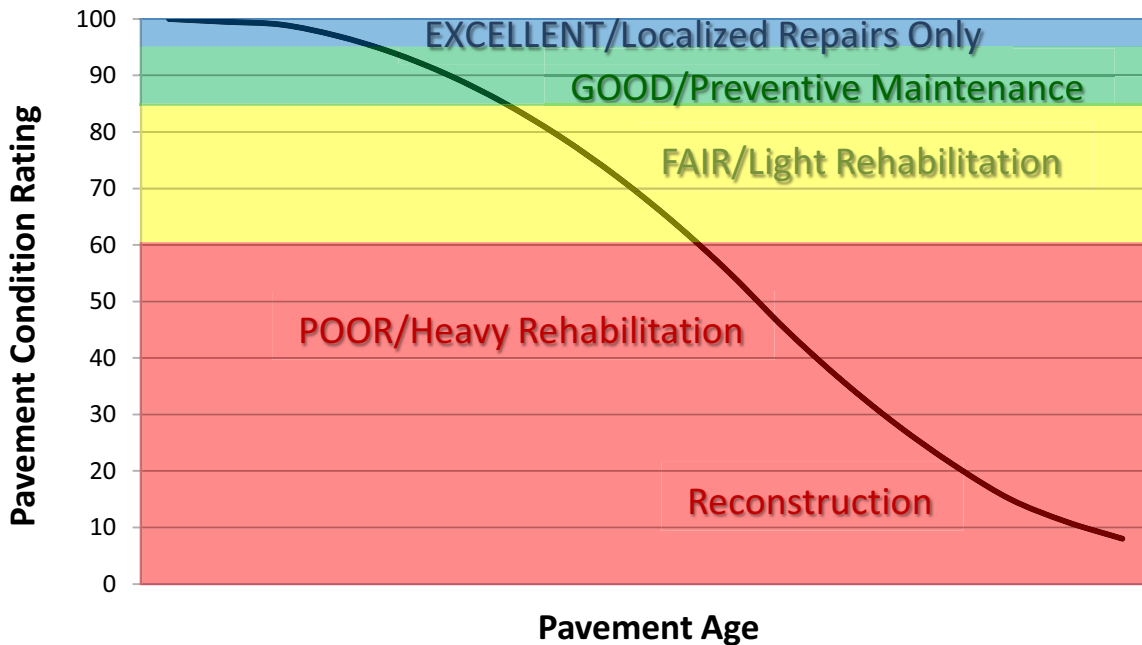
Explanation of the Excellent, Good, Fair and Poor Condition Descriptions

In addition to the RIP Index changes that will be 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 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), Road Inventory Program (RIP) for the National Park Service (NPS), 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). 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 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. 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 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 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, 168 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 RIP 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 23.

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 patch may not exceed 0.30 mi. (0.48 km). (Any full-lane patch exceeding 0.30 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.

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 535% 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 = *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 Inertial Measuring Unit (IMU) to provide accurate positioning data 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	+ - 0.1 degrees
Grade	+ - 0.1 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.

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 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 with 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.

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