The Road Inventory of Quinault National Fish Hatchery

Humptulips, WA

Prepared By:
Federal Highway Administration
Central Federal Lands Highway Division
April 2013

TABLE OF CONTENTS

SECTION		PAGE
I.	**INTRODUCTION**	1 - 1
II.	**SUMMARY INFORMATION** Summaries by Condition, Surface Type and Functional Class	 2 - 1
III.	**REFUGE ROUTE LOCATION MAPS**	3 - 1
IV.	**ROUTE IDENTIFICATION LIST**	4 - 1
V.	**ROUTE CONDITION RATING SHEETS**	5 - 1
VI.	**PARKING LOT CONDITION RATING SHEETS**	6 - 1
VII.	**BRIDGE INVENTORY INFORMATION**	7 - 1
VIII.	**PHOTOGRAPHIC SHEETS**	8 - 1
IX.	**ACCIDENT SUMMARY**	9 - 1
	APPENDIX Functional Classification Table Description of Rating System	 i ii

INTRODUCTION

The Transportation Equity Act for the 21st Century (Public Law 105-178) created the Refuge Roads Program. Refuge roads are those public roads that provide access to or within a unit of the National Wildlife Refuge System and for which title and maintenance responsibility is vested in the United States Government. Funds from the Highway Trust Fund are available for refuge roads and can be used by the station to pay the cost of:

(a) Maintenance and improvements of refuge roads.
(b) Maintenance and improvements of:
    (1) Adjacent vehicle parking areas
    (2) Provision for pedestrians and bicycles and
    (3) Construction and reconstruction of roadside rest areas that are located in or adjacent to wildlife refuges
(c) Administrative costs associated with such maintenance and improvements.

The funds available for refuge roads are to be disbursed based on the relative needs of the various refuges in the National Wildlife Refuge System, and taking into consideration:

(a) The comprehensive conservation plan for each refuge;
(b) The need for access as identified through land use planning; and
(c) The impact of land use planning on existing transportation facilities.

To determine the relative needs of the U.S. Fish and Wildlife Service, the Federal Highway Administration (FHWA) was asked to inventory all public access roads and parking lots and provide a condition assessment of each. In 2008 the inventory was expanded to include administrative (service use only) roads and parking lots. An FHWA representative meets with refuge personnel to identify route segments and assign route numbers and functional classifications (See Appendix) for each route. All roads and parking lots are mapped using Trimble GPS units and visually assessed for condition using the RSL method of evaluation developed at Utah State University (See Appendix). Culverts, Gates, Guardrails and Low Water Crossings are also mapped and inspected for any obvious defects.

An estimate is provided, in year 2008 dollars, based on the condition determined by the rating system. Estimates are based upon data and location factors from the 2008 RS Means Heavy Construction Cost Data 22nd Annual Edition. Cost estimates should be evaluated on a case-by-case basis when being used for programming purposes.

Native Surfaced roads and parking lots already inventoried will not be re-inventoried and will not appear individually in report chapters 5, 6 and 8. Mileages and areas of native surfaced roads and parking lots will still appear in all summaries in the report and will remain in the road inventory database. In addition to this report, the FHWA will furnish the condition ratings of each route and segment to the Fish and Wildlife Service in a Microsoft Access database so the data can be included in their Real Property Inventory.

Quinault NFH - 13250
Summaries

Route Miles and Percentages by Functional Class and Condition

Condition Rating (Based on RSL)*

F. C.	Excellent MILES	Excellent %	Good MILES	Good %	Fair MILES	Fair %	Poor MILES	Poor %	Failed MILES	Failed %	TOTAL MILES
I	0.00	0.0%	0.00	0.0%	0.28	100.0%	0.00	0.0%	0.00	0.0%	0.28
II	0.00	0.0%	0.24	100.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.24
III	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
IV	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
V	0.09	9.1%	0.90	90.9%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.99
Totals	**0.09**	**6.0%**	**1.14**	**75.5%**	**0.28**	**18.5%**	**0.00**	**0.0%**	**0.00**	**0.0%**	**1.51**

*For a description of condition ratings for the various surface types see the Appendix.

Route Miles and Percentages by Surface Type and Condition

Paved Condition Rating [Condition(RSL)]

Surface	Excellent MILES	Excellent %	Good MILES	Good %	Fair MILES	Fair %	Poor MILES	Poor %	Failed MILES	Failed %	TOTAL MILES
AS	0.00	0.0%	0.00	0.0%	0.28	100.0%	0.00	0.0%	0.00	0.0%	0.28
CO	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
Totals	**0.00**	**0.0%**	**0.00**	**0.0%**	**0.28**	**100.0%**	**0.00**	**0.0%**	**0.00**	**0.0%**	**0.28**

Unpaved Condition Rating [Condition(RSL)]

Surface	Excellent MILES	Excellent %	Good MILES	Good %	Fair MILES	Fair %	Poor MILES	Poor %	Failed MILES	Failed %	TOTAL MILES
GR	0.09	7.3%	1.14	92.7%	0.00	0.0%	0.00	0.0%	0.00	0.0%	1.23
NA	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
PR	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
Totals	0.09	**7.3%**	1.14	**92.7%**	0.00	**0.0%**	0.00	**0.0%**	0.00	**0.0%**	**1.23**

Square Footage (Parking Areas)

Condition Rating

Surface	Excellent SQ FT	Excellent %	Good SQ FT	Good %	Fair SQ FT	Fair %	Poor SQ FT	Poor %	Failed SQ FT	Failed %	Total SQ FT
AS	0	0.0%	82,949	100.0%	0	0.0%	0	0.0%	0	0.0%	82,949
CO	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
GR	0	0.0%	0	0.0%	20,185	100.0%	0	0.0%	0	0.0%	20,185
NA	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
PR	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Totals	**0**	**0.0%**	**82,949**	**80.4%**	**20,185**	**19.6%**	**0**	**0.0%**	**0**	**0.0%**	**103,134**

Quinault NFH - 13250
Summaries

Route Miles and Percentages by Use Type and Condition

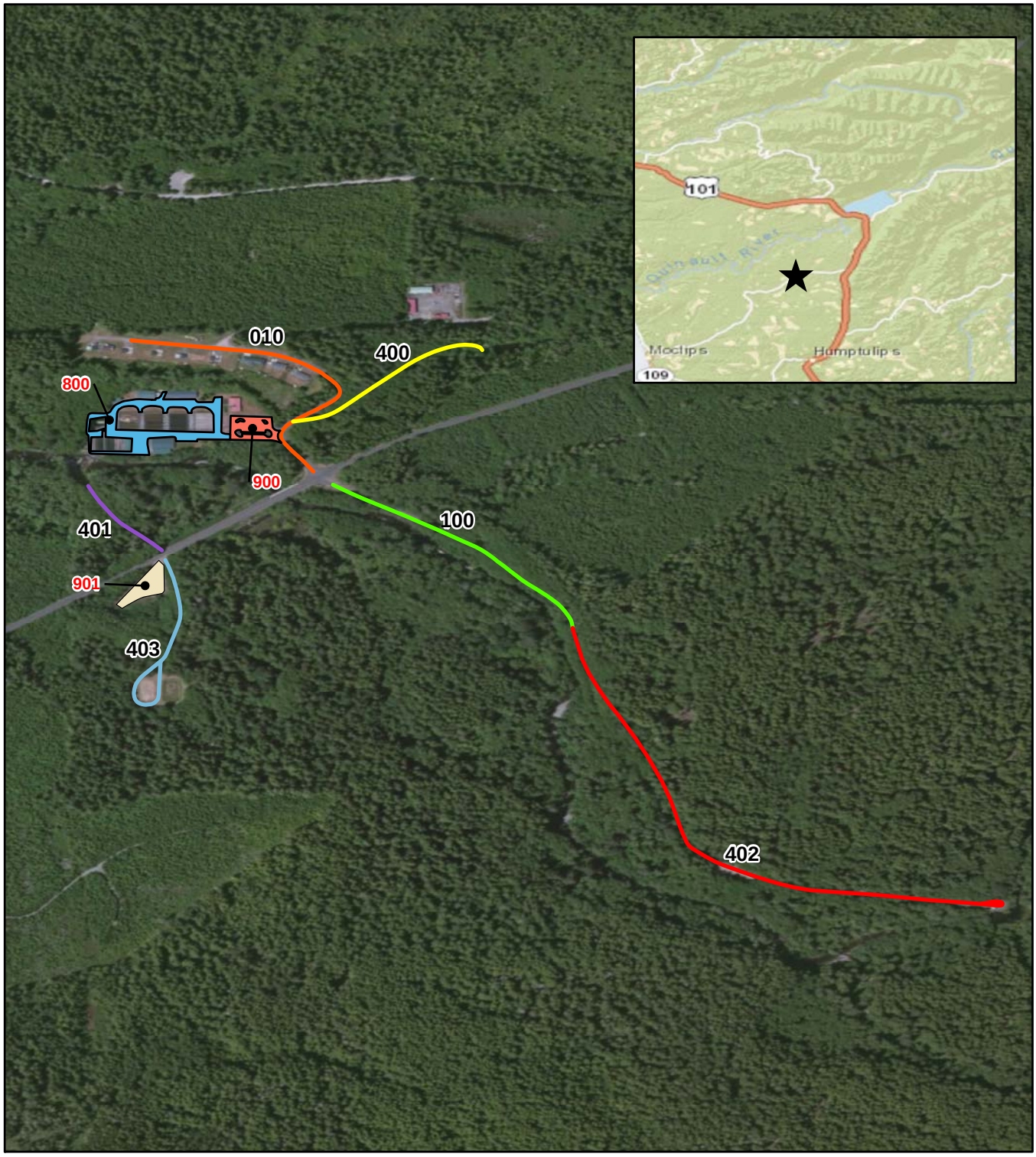
Road Condition Rating: Public/Administrative Use

USE TYPE	Excellent		Good		Fair		Poor		Failed		TOTAL MILES
	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	
Public (FC I-III)	0.00	0.0%	0.24	46.2%	0.28	53.8%	0.00	0.0%	0.00	0.0%	0.52
Admin (FC IV-V)	0.09	9.1%	0.90	90.9%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.99
Totals	**0.09**	**6.0%**	**1.14**	**75.5%**	**0.28**	**18.5%**	**0.00**	**0.0%**	**0.00**	**0.0%**	**1.51**

Parking Condition Rating: Public/Administrative Use

USE TYPE	Excellent		Good		Fair		Poor		Failed		Total Sq Ft
	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	
Public	0	0.0%	19938	49.7%	20185	50.3%	0	0.0%	0	0.0%	40,123
Admin	0	0.0%	63011	100.0%	0	0.0%	0	0.0%	0	0.0%	63,011
Totals	**0**	**0.0%**	**82,949**	**80.4%**	**20,185**	**19.6%**	**0**	**0.0%**	**0**	**0.0%**	**103,134**

Quinault National Fish Hatchery
ROUTE LOCATION MAP



N

0 0.125 0.25 0.5 0.75 1 Miles

Quinault NFH - 13250
Route Identification List

Shading Color Key:	
	White = Paved Routes
	Yellow = Unpaved Routes

RTE #	Asset Number	ROUTE NAME	RTE MI	ROUTE DESCRIPTION	PAVED MI	UN-PAVED MI	LANES	FC
010	10002822	Hatchery Entrance Road	0.28	From Moclips Highway to end of route	0.28	-	2	1
100	10063730	Cook Creek Road	0.24	From Moclips Highway to Cook Creek Service Road (Route 402)	-	0.24	1	2
400	10063731	Hatchery Creek Water Intake Road	0.17	From Hatchery Entrance Road (Route 010) to end of route	-	0.17	1	5
401	10063731	Electric Fish Barrier Road	0.09	From Moclips Highway to fish barrier	-	0.09	1	5
402	10063731	Cook Creek Service Road	0.51	From Cook Creek Road (Route 100) to end of loop	-	0.51	1	5
403	10063731	Service Access Road to Lagoons	0.22	From Moclips Highway to end of loop	-	0.22	1	5

Quinault NFH - 13250

Route Identification List (Parking)

Shading Color Key:	
	White = Paved Routes
	Green = Unpaved Routes

Route #	Asset Number	ROUTE NAME	Area (Sq Ft)	ROUTE DESCRIPTION	Surface Type
800	10063732	Hatchery Raceway Parking	63,011	From Hatchery Parking (Route 900)	Asphalt
900	10063729	Hatchery Parking	19,938	From Hatchery Entrance Road (Route 010)	Asphalt
901	-	Overflow Visitor Parking	20,185	From Moclips Highway	Gravel

CHANGES TO THE FISH AND WILDLIFE SERVICE ROAD INVENTORY REPORT

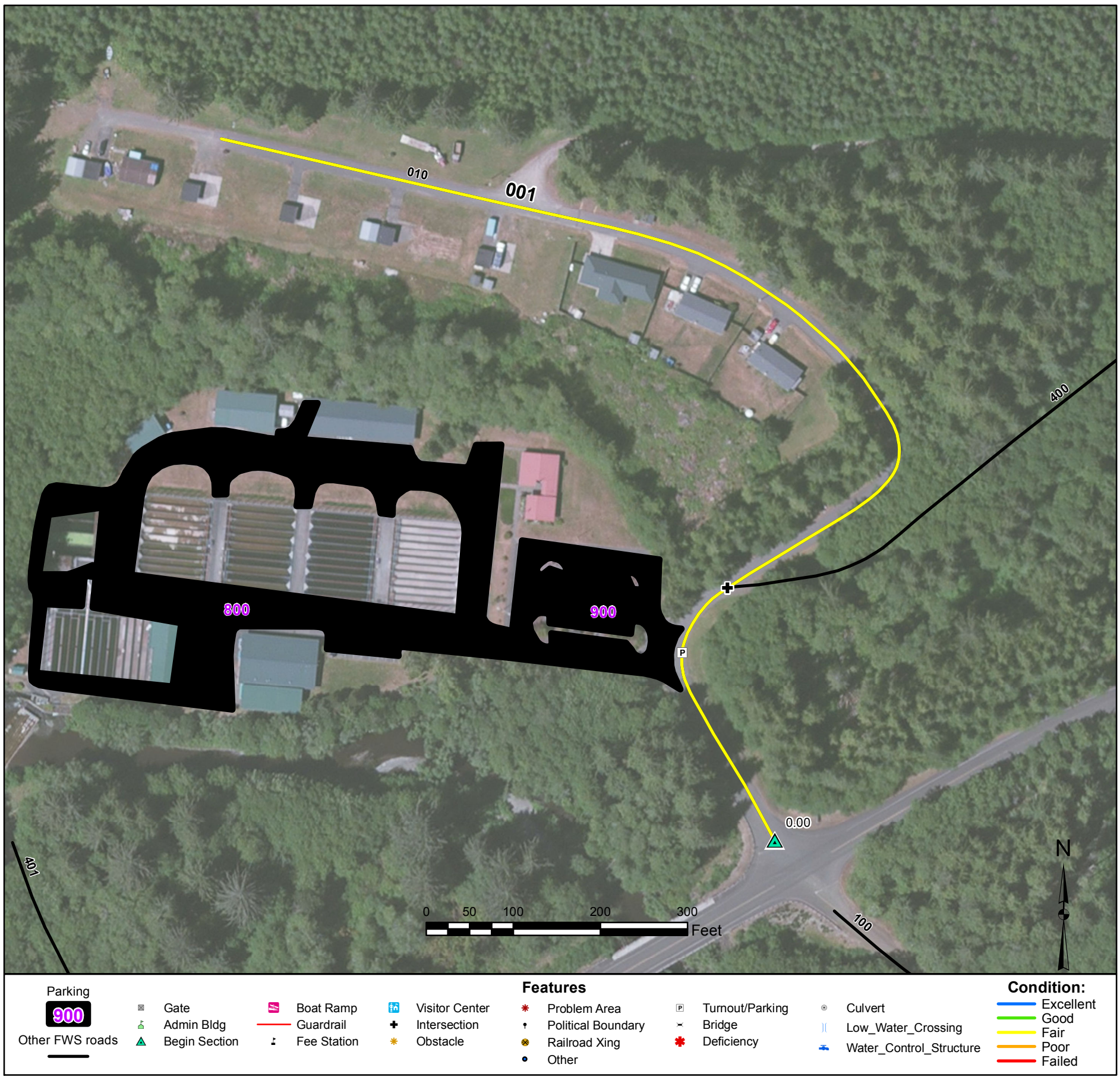
Quinault NFH

Routes added to previous inventory:		
Rte #	**Rte Name**	**Reason For Addition**
400	Hatchery Creek Water Intake Road	New Administrative Route
401	Electric Fish Barrier Road	New Administrative Route
402	Cook Creek Service Road	New Administrative Route
403	Service Access Road to Lagoons	New Administrative Route
800	Hachery Raceway	New Administrative Route

Routes removed from previous inventory:		
Rte #	**Rte Name**	**Reason For Removal**

Routes modified from previous inventory:			
Rte #	**Rte Name**	**Type of Modification**	**Description of Modification**
100	Cook Creek Road	Name Change	

Comments:



Hatchery Entrance Road

From Moclips Highway to end of route

Route Number: 010

Total Route Mileage: 0.28

Asset Number	10002822				
Section Number	001				
Section Length (miles)	0.28				
Inspection Date	02-20-2013				
Surface Type	Asphalt				
Number of Lanes	2				
Roadway Width (feet)	24				
Condition	Fair				
Remaining Service Life (years)	8				
Estimated Cost to Repair	$35,200				
Current Replacement Value	$390,200				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Turnout/Parking	001-0.04						
Intersection	001-0.06						

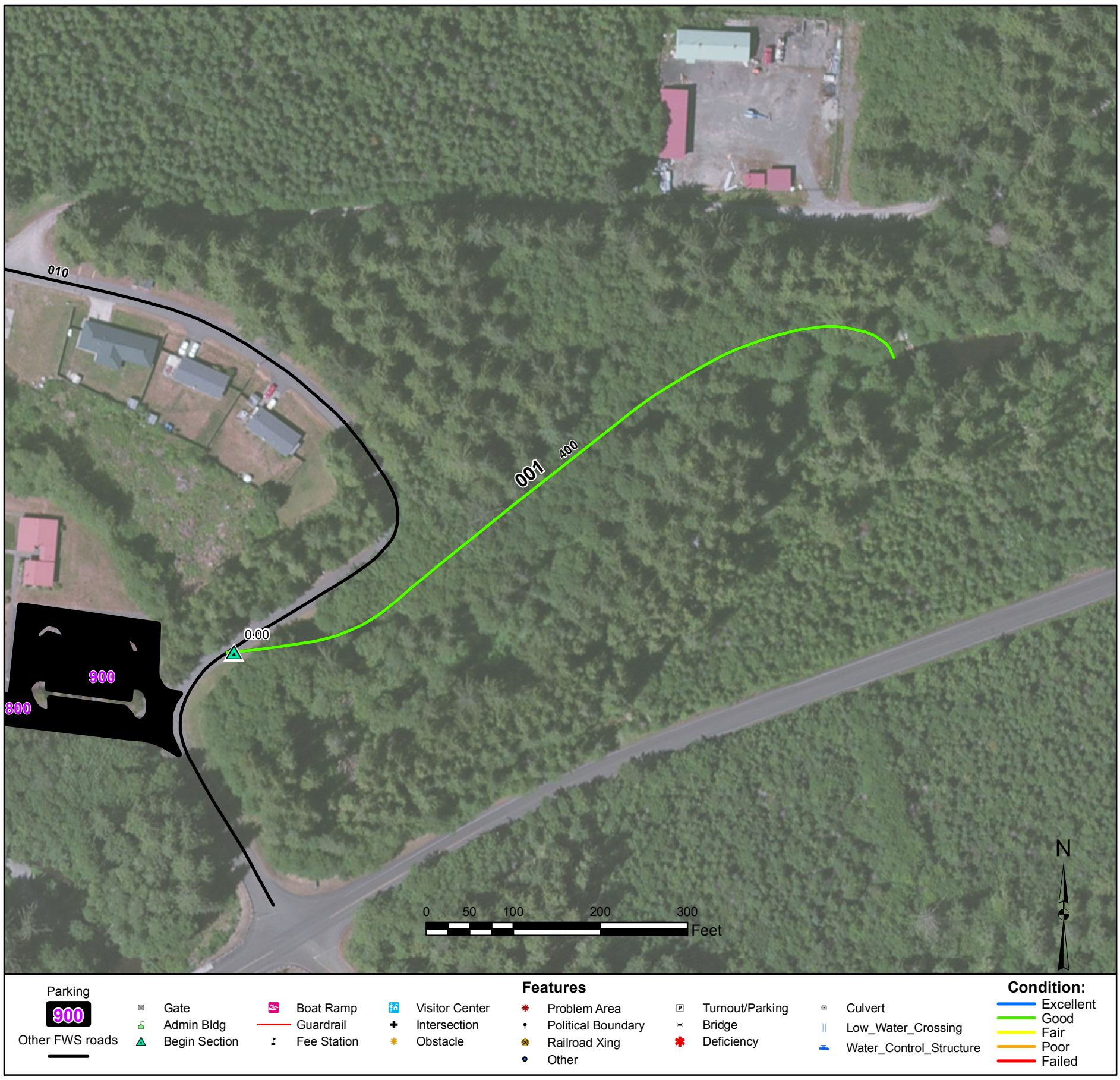
Cook Creek Road

From Moclips Highway to Cook Creek Service Road (Route 402)

Route Number: 100 Total Route Mileage: 0.24

Asset Number	10063730				
Section Number	001				
Section Length (miles)	0.24				
Inspection Date	02-20-2013				
Surface Type	Gravel				
Number of Lanes	1				
Roadway Width (feet)	14				
Condition	Good				
Remaining Service Life (years)	7				
Estimated Cost to Repair	$400				
Current Replacement Value	$189,800				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
2 Culverts	001-0.1						
Culvert	001-0.22						
Turnout/Parking	001-0.23						
Culvert	001-0.23						



Hatchery Creek Water Intake Road

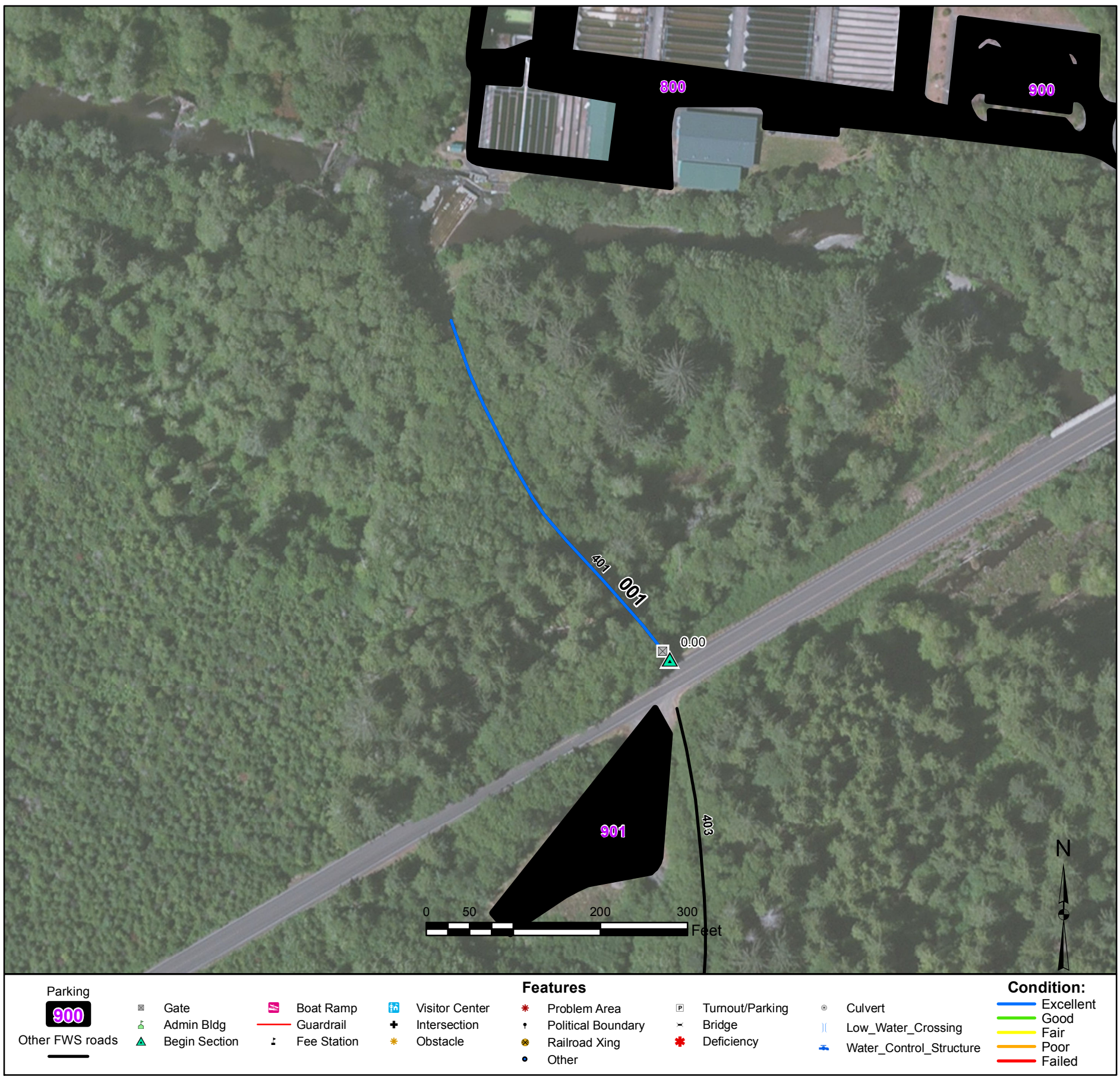
From Hatchery Entrance Road (Route 010) to end of route

Route Number: 400

Total Route Mileage: 0.17

Asset Number	10063731				
Section Number	001				
Section Length (miles)	0.17				
Inspection Date	02-20-2013				
Surface Type	Gravel				
Number of Lanes	1				
Roadway Width (feet)	12				
Condition	Good				
Remaining Service Life (years)	5				
Estimated Cost to Repair	$300				
Current Replacement Value	$134,300				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						



Electric Fish Barrier Road

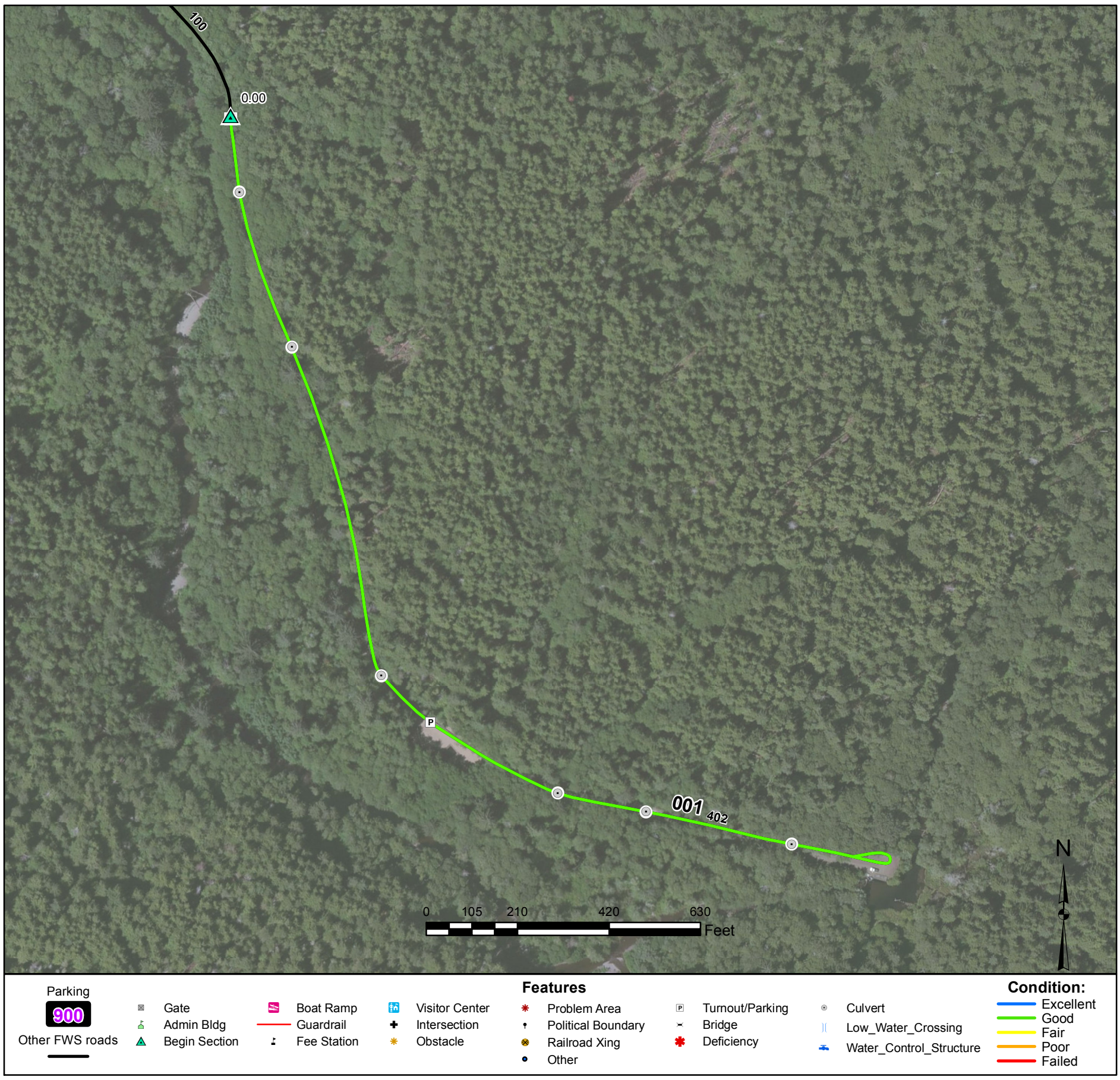
From Moclips Highway to fish barrier

Route Number: 401

Total Route Mileage: 0.09

Asset Number	10063731				
Section Number	001				
Section Length (miles)	0.09				
Inspection Date	02-20-2013				
Surface Type	Gravel				
Number of Lanes	1				
Roadway Width (feet)	12				
Condition	Excellent				
Remaining Service Life (years)	9				
Estimated Cost to Repair	$0				
Current Replacement Value	$70,600				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.0						



Cook Creek Service Road

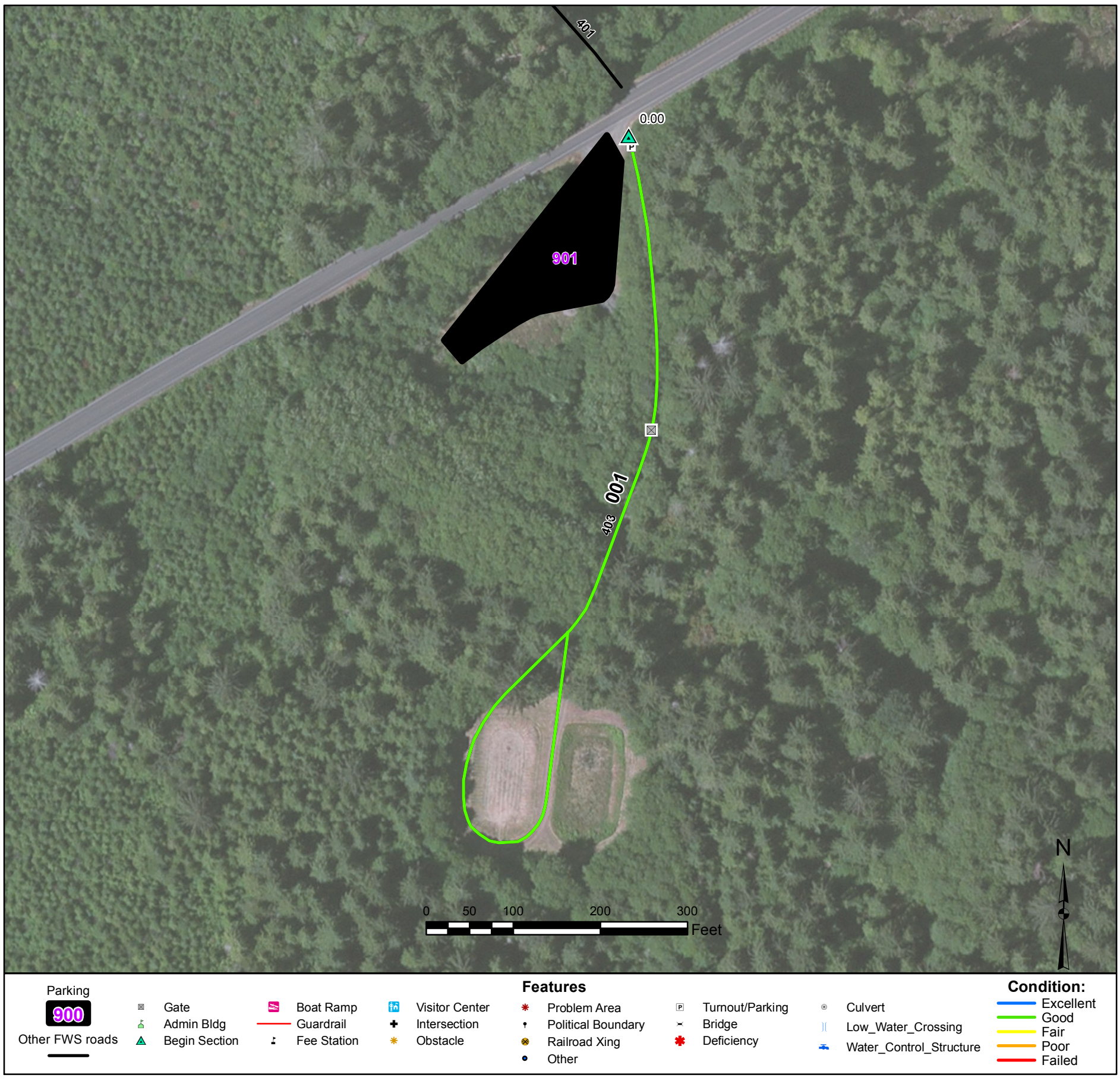
From Cook Creek Road (Route 100) to end of loop

Route Number: 402

Total Route Mileage: 0.51

Asset Number	10063731				
Section Number	001				
Section Length (miles)	0.51				
Inspection Date	02-20-2013				
Surface Type	Gravel				
Number of Lanes	1				
Roadway Width (feet)	14				
Condition	Good				
Remaining Service Life (years)	5				
Estimated Cost to Repair	$1,000				
Current Replacement Value	$407,700				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.0						
Culvert	001-0.03						
Culvert	001-0.09						
Culvert	001-0.22						
Turnout/Parking	001-0.25						
Culvert	001-0.32						
Culvert	001-0.36						
2 Culverts	001-0.44						



Service Access Road to Lagoons

From Moclips Highway to end of loop

Route Number: 403

Total Route Mileage: 0.22

Asset Number	10063731				
Section Number	001				
Section Length (miles)	0.22				
Inspection Date	02-20-2013				
Surface Type	Gravel				
Number of Lanes	1				
Roadway Width (feet)	12				
Condition	Good				
Remaining Service Life (years)	7				
Estimated Cost to Repair	$400				
Current Replacement Value	$177,000				

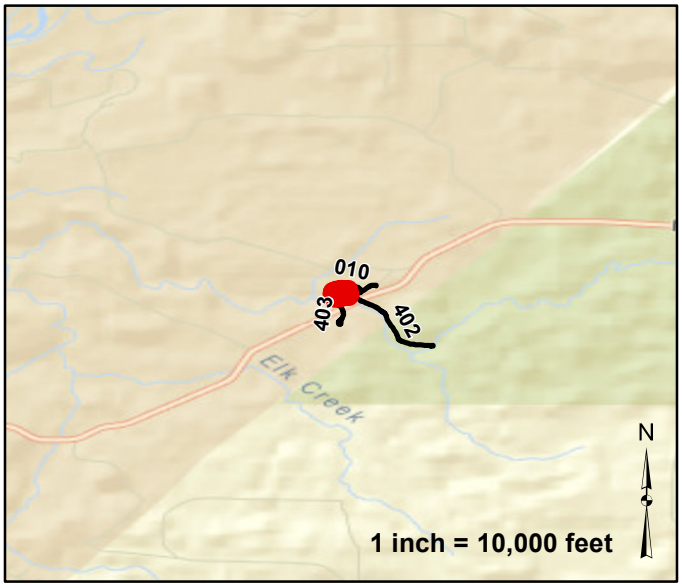
Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Turnout/Parking	001-0.0						
Gate	001-0.06						

Route Number: 800

Hatchery Raceway Parking

From Hatchery Parking (Route 900)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10063732	63011	9	Good	Asphalt	$13,500	02-20-2013	$660,700



Parking

900

Other FWS roads

Features

Gate
Admin Bldg
Begin Section
Boat Ramp
Guardrail
Fee Station
Visitor Center
Other
Problem Area
Culvert
Low_Water_Crossing
Water_Control_Structure

Condition:

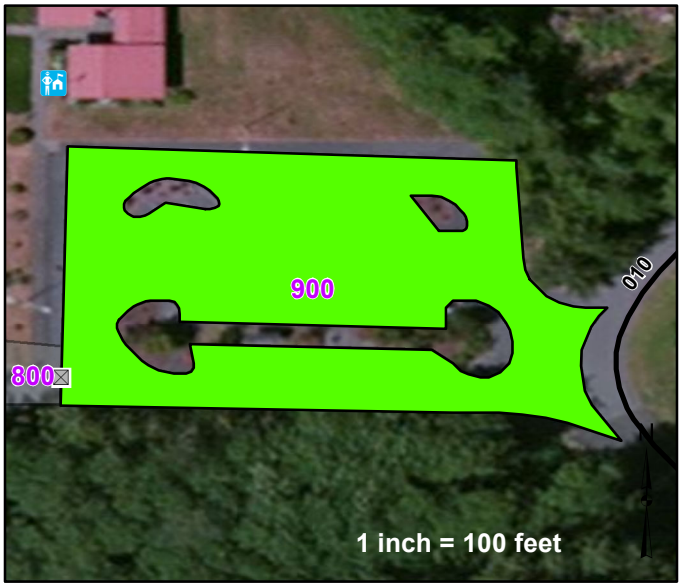
Excellent
Good
Fair
Poor
Failed

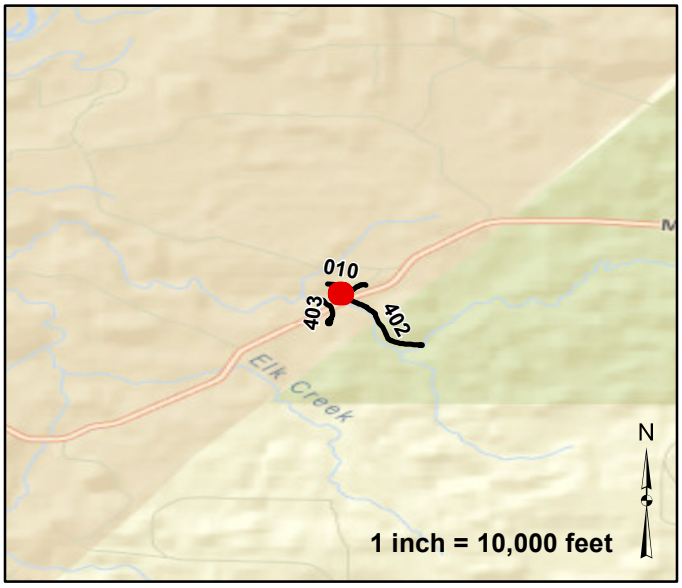
Route Number: 900

Hatchery Parking

From Hatchery Entrance Road (Route 010)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10063729	19938	21	Good	Asphalt	$4,300	02-20-2013	$209,100





Parking

900

Other FWS roads

Features

Gate
Admin Bldg
Begin Section
Boat Ramp
Guardrail
Fee Station
Visitor Center
Other
Problem Area
Culvert
Low_Water_Crossing
Water_Control_Structure

Condition:

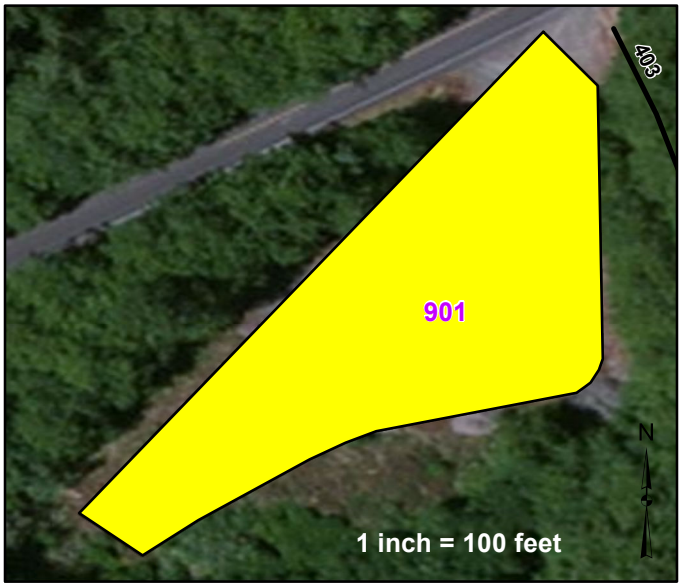
Excellent
Good
Fair
Poor
Failed

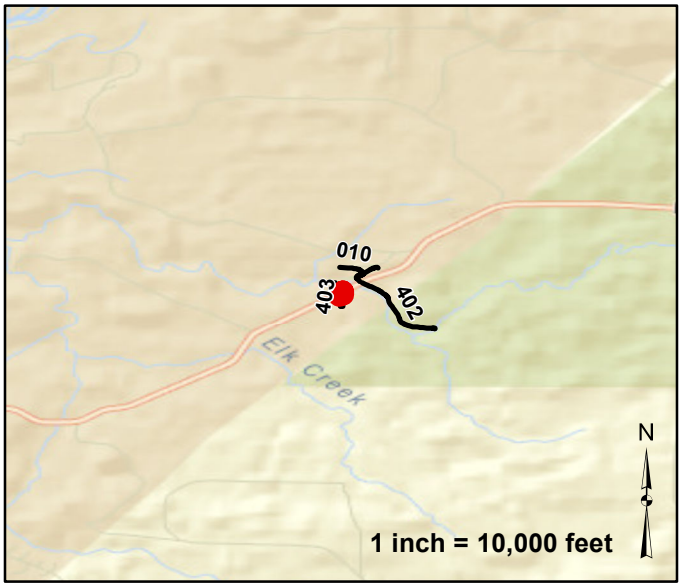
Route Number: 901

Overflow Visitor Parking

From Moclips Highway

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	20185	16	Fair	Gravel	$6,200	02-20-2013	$115,500





Parking

900

Other FWS roads

Features

Gate
Admin Bldg
Begin Section
Boat Ramp
Guardrail
Fee Station
Visitor Center
Other
Problem Area
Culvert
Low_Water_Crossing
Water_Control_Structure

Condition:

Excellent
Good
Fair
Poor
Failed

Quinault NFH Bridge Inventory					
Rte #	Milepost	NBIS #	Sufficiency Rating	Functionally Obsolete	Structurally Deficient
No Bridges to Report					

Features Photographs

Photo: QUIN_C4_0132 Route: 010-001-0.0
Begin Section

ROUTE: 100

Features Photographs

Photo: QUIN_C4_0140 Route: 100-001-0.0
Begin Section

Photo: QUIN_C4_0141 Route: 100-001-0.1
2 Metal Culvert 50ft long 36in dia. 6ft deep

Photo: QUIN_C4_0142 Route: 100-001-0.1
2 Metal Culvert 50ft long 36in dia. 6ft deep

Photo: QUIN_C4_0143 Route: 100-001-0.22
Plastic Culvert 45ft long 12in dia. 2ft deep

Photo: QUIN_C4_0144 Route: 100-001-0.22
Plastic Culvert 45ft long 12in dia. 2ft deep

Photo: QUIN_C4_0147 Route: 100-001-0.23
Metal Culvert 50ft long 90in dia. 4ft deep

Features Photographs

Photo: QUIN_C4_0148 Route: 100-001-0.23
Metal Culvert 50ft long 90in dia. 4ft deep

Features Photographs

Photo: QUIN_C4_0133 Route: 400-001-0.0
Begin Section

ROUTE: 401

Features Photographs

Photo: QUIN_C4_0134 Route: 401-001-0.0
Begin Section

Photo: QUIN_C4_0135 Route: 401-001-0.0
Metal Open Rail Gate

ROUTE: 402

Features Photographs

Photo: QUIN_C4_0149 Route: 402-001-0.0
Begin Section

Photo: QUIN_C4_0145 Route: 402-001-0.0
Metal Open Rail Gate

Photo: QUIN_C4_0150 Route: 402-001-0.03
Metal Culvert 50ft long 48in dia. 2ft deep

Photo: QUIN_C4_0151 Route: 402-001-0.03
Metal Culvert 50ft long 48in dia. 2ft deep

Photo: QUIN_C4_0152 Route: 402-001-0.09
Metal Culvert 50ft long 30in dia. 2ft deep

Photo: QUIN_C4_0154 Route: 402-001-0.09
Metal Culvert 50ft long 30in dia. 2ft deep

Features Photographs

Photo: QUIN_C4_0155 Route: 402-001-0.22
Plastic Culvert 50ft long 12in dia. 2ft deep

Photo: QUIN_C4_0156 Route: 402-001-0.22
Plastic Culvert 50ft long 12in dia. 2ft deep

Photo: QUIN_C4_0157 Route: 402-001-0.32
Metal Culvert 50ft long 36in dia. 4ft deep

Photo: QUIN_C4_0158 Route: 402-001-0.32
Metal Culvert 50ft long 36in dia. 4ft deep

Photo: QUIN_C4_0159 Route: 402-001-0.36
Metal Culvert 60ft long 36in dia. 2ft deep

Photo: QUIN_C4_0160 Route: 402-001-0.36
Metal Culvert 60ft long 36in dia. 2ft deep

ROUTE: 402

Features Photographs

Photo: QUIN_C4_0161 Route: 402-001-0.44
2 Metal Culvert 50ft long 48in dia. 2ft deep

Photo: QUIN_C4_0162 Route: 402-001-0.44
2 Metal Culvert 50ft long 48in dia. 2ft deep

ROUTE: 403

Features Photographs

Photo: QUIN_C4_0138 Route: 403-001-0.0
Begin Section

Photo: QUIN_C4_0139 Route: 403-001-0.06
Metal Open Rail Gate

Features Photographs

Photo: QUIN_C4_0129 Route: 900
Metal Open Rail Gate

Accident Summary

Number of Accidents Reported	Timespan of Accidents	Injuries	Fatalities
0	No Accidents to Report	0	0

APPENDIX

TABLE 1 - GENERAL FWS ROAD FUNCTIONAL CLASSIFICATION	
Class I	Principal Refuge Road (Public Roads) - Routes that constitute the main access route, main auto tour route, or thoroughfare for refuge visitors. These routes are accessible by 2WD vehicles. Routes are numbered from 10 to 99.
Class II	Connector Refuge Road (Public Roads) - Routes that provide circulation within the refuge. These routes can also provide access to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, education centers, etc. These routes are accessible by 2WD vehicles. Routes are numbered from 100 to 199.
Class III	Special Purpose Refuge Road (Public Roads) - Roads that provide circulation within special use areas such as campgrounds or public concessionaire facilities or access to remote areas of the refuge. These routes may not be 2WD accessible. Routes are numbered from 200 to 299
Class IV	Administrative Access Road (Administrative Roads) - Routes intended for access to administrative developments or structures such as maintenance offices, employee quarters, or utility areas. These routes are accessible by 2WD vehicles. These routes may restrict access to the general public. Routes are numbered from 300 to 399.
Class V	Restricted Road (Administrative Roads) - Routes normally closed to the public, such as maintenance roads, service roads, patrol roads, and fire breaks. These routes may be open to the public for a short period of time for a special use, such as hunting access. These routes may not be 2WD accessible. Routes are numbered from 400 to 499.

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

DESCRIPTION OF RATING SYSTEM

Rating Data is collected on four different surface types: Asphalt, Concrete, Gravel, and Native. The Utah LTAP Center's Remaining Service Life (RSL) system is used for all surface types. The RSL system is based on the Strategic Highway Research Program's (SHRP) Distress Identification Manual.

Asphalt Rating System

Data is collected on the following distresses and conditions:

- **Fatigue Cracking -** Interconnected cracks forming small irregular shapes.
- **Longitudinal Cracking -** Cracks running parallel with the roadway, in the direction of traffic.
- **Transverse Cracking -** Cracks perpendicular to the roadway, going across the lane or lanes.
- **Block Cracking -** Interconnected cracks forming large blocks.
- **Edge Cracking –** Cracks running along the edge of the pavement surface.
- **Patches -** Original surface repaired with new asphalt patch material.
- **Potholes -** Holes or depressions in the pavement.
- **Rutting -** surface depressions in the wheel paths.
- **Roughness –** Evenness of pavement for serviceability.
- **Drainage –** Ability of the road surface to drain water based on proper slope.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

Fatigue, longitudinal, transverse, block, and edge cracking, along with patching and potholes are rated on a 0 - 9 scale (0 = no distress, 9 = maximum distress). The rating given is based on the extent and the severity of the distress. Rutting, roughness, and drainage are rated on a 0 - 3 scale (0 = excellent, 3 = poor). Each distress type has given Remaining Service Life (RSL) values (in years) based on the rating for that particular distress. The distress with the rating resulting in the lowest RSL value is considered to be the governing distress. That value is then assigned as the RSL of the road segment.

Concrete Rating System

Data is collected on the following distresses and conditions:

- **Spalling of Joints –** Chipping, breaking, or cracking of slab edges
- **Joint Seal Damage –** Any damage or condition that enables materials or water to infiltrate into the joint from the surface.
- **Corner Breaks –** A portion of the slab separated by a crack that intersects the adjacent transverse and longitudinal joints, forming approximately a 45° angle to the direction.
- **Broken Slabs –** Faulting and/or cracking localized to individual slabs.

- **Faulting** – Difference in elevation across a crack or joint.
- **Longitudinal Cracking** – Cracks in the pavement running parallel to road.
- **Transverse Cracking** - Cracks in the pavement running perpendicular to the direction of traffic.
- **Patch Deterioration** – Faulting, settling, or cracking of previously placed patch
- **Map Cracking** – A series of cracks that extend only into the upper surface of the Slab

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula
The rating procedure for concrete pavement is the same as that for asphalt pavement described previously. Each of the distresses described above are rated on the same 0 – 9 scale. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Gravel and Native Rating System

Data is collected on the following distresses and conditions:
- **Cross Section (Crown)** - Roadway built so that the center is higher than the shoulder, to prevent water from pooling on roadway.
- **Roadside Drainage** - Roadside ditches and culverts to handle water flow and prevent pooling on the roadside.
- **Corrugations (Washboarding)** - Small trenches or holes developing perpendicular to the roadway.
- **Potholes** - Holes or depressions in the roadway.
- **Rutting** - Depressions running parallel with the roadway, in the wheelpaths.
- **Dust** - Amount of dust caused by traffic.
- **Loose Aggregate (Gravel Only)** - Loose gravel, typically piled up on the roadway edges or centerline.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula
The rating procedure for unpaved roads is the same as that for asphalt and concrete pavements described previously. Of the distresses described above, corrugations, potholes, rutting, and loose aggregate are rated on the same 0 – 9 scale previously mentioned. Cross section, roadside drainage, and dust are rated on the same 0 – 3 scale described for asphalt pavement. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Condition Descriptions by Surface Type

The following definitions are used to describe pavement condition for the various surface types. These are general guidelines for condition indications.

Asphalt

Excellent – Recently constructed or overlaid road where construction or overlay was performed correctly- No maintenance required. RSL = 19-20 years.

Good – Low extent longitudinal and transverse cracks. All cracks are 1/4" or less with little or no crack erosion. Patches are in good condition and applied correctly. Routine Maintenance recommended. RSL = 13-18 years.

Fair - Roads are in good structural condition with little or no fatigue cracking. Longitudinal, transverse, and edge cracking is at medium extent and severity. Block cracking is not extensive. Any patches are in good condition. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Road beginning to show signs of structural distress. Fatigue cracking is medium to high extent and medium severity. Cracking will be severe. Surface may have severe block cracking and show. Patches are in fair to poor condition. There is moderate distortion or rutting and occasional potholes. Rehabilitation recommended. RSL = 1-6 years.

Failed - Road is severely deteriorated. Signs of structural failure appear along with severe and extensive fatigue cracking, distortion, potholes, or extensive patches in poor condition. Reconstruction recommended. RSL = 0 years.

Concrete

Excellent - New pavement. No maintenance required. RSL = 19-20 years

Good - First signs of transverse cracking, patch or repair, more extensive pop-outs, or scaling. Sealing or routine maintenance recommended. RSL = 13-18 years.

Fair – Pavement has join or crack spalling, and/or faulting, along with cracking at corners with broken pieces. Any Patches are in fair condition and faulting is at a minimum. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Joints and cracks are open 1 inch, spalled, or patched. Faulting is more severe. Rehabilitation recommended. RSL = 1-6 years.

Failed - Most slabs have failed structurally, and faulting is severe. Reconstruction recommended. RSL = 0 years.11-9

The following table shows the relationship between RSL and condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Asphalt and Concrete Pavements)								
	FAILED	POOR		FAIR		GOOD		EXCELLENT
RSL Years	0	1-3	4-6	7-9	10-12	13-15	16-18	19-20

Gravel and Native

Note - Native surfaces do not have a gravel layer.

Excellent - Newly constructed road that has been constructed properly with proper crown, drainage and gravel layer. Little or no distress. No maintenance recommended. RSL = 8-10 years.

Good - Crown, drainage provisions, and gravel layer are in good condition. Distress limited to traffic effects such as dust, loose aggregate, and low severity corrugations (wash boarding). RSL = 5-7 years.

Fair - Adequate drainage and crown through majority of roadway. Crown repair, ditch improvement may be necessary. Road has more severe corrugations and potholes. Preventative maintenance recommended. RSL = 3-4 years.

Poor - Travel at slow speeds is necessary. Additional gravel layer needed to carry traffic. Poor crown. Ditching is inadequate and rutting is extensive and severe. Rehabilitation recommended. RSL = 1-2 years.

Failed - Travel is difficult, and road may be closed at times. Rutting and Corrugations are very severe. Total Reconstruction of road is recommended. RSL = 0 years.

The following table shows the RSL values for gravel and native roads in terms of excellent, good, fair, poor, and failed condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Gravel and Native Surfaces)					
	FAILED	POOR	FAIR	GOOD	EXCELLENT
RSL Years	0	1-2	3-4	5-7	8-10

NATIVE PRIMITIVE/IMPROVED RATING SHEET

Cross Section (Crown)*

Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

Rutting

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
	Low < 6"	1	2	3
	Med 6-12"	4	5	6
	High > 12"	7	8	9

Roadside Drainage*

Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

Potholes

Severity	No Defects	Extent (Area) Low <10%	Med 10-30%	High >30%
	Low < 6"	1	2	3
	Med 6-12"	4	5	6
	High > 12"	7	8	9

Dust

Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

Corrugations

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
	Low < 3"	1	2	3
	Med 3-6"	4	5	6
	High > 6"	7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

GRAVEL RATING SHEET

Cross Section (Crown)

Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

Rutting

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

Roadside Drainage

Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

Potholes

Severity	No Defects	Extent (Area) Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

Dust

Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

Corrugations

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
	Low < 2"	1	2	3
	Med 2-4"	4	5	6
	High > 4"	7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

Loose Aggregate

Severity	No Defects	Extent (Area) Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

ASPHALT RATING SHEET

Fatigue Cracking

Severity	Extent: Low 1 crack WP	Extent: Med 2 cracks WP	Extent: High >30% length
Low-Cracks < 1/4"	1	2	3
Med-Cracks 1/4-3/4"	4	5	6
High-Cracks > 3/4"	7	8	9

Edge Cracking

Severity	Extent (Length): Low <10%	Extent (Length): Med 10-30%	Extent (Length): High >30%
0-6" from curb	1	2	3
6-18" from curb	4	5	6
> 18" from curb	7	8	9

Longitudinal Cracking

Severity	Extent: Low 1 crack full length	Extent: Med 2 cracks full length	Extent: High >2 cracks full length
Low-Cracks < 1/4"	1	2	3
Med-Cracks 1/4-3/4"	4	5	6
High-Cracks > 3/4"	7	8	9

Block Cracking

Severity	Extent (Length): Low > 15x15' squares	Extent (Length): Med 15-10' squares	Extent (Length): High <10x10' squares
Low-Cracks < 1/4"	1	2	3
Med-Cracks 1/4-3/4"	4	5	6
High-Cracks > 3/4"	7	8	9

Transverse Cracking

Severity	Extent (ft between cracks): Low > 200'	Extent (ft between cracks): Med 200-50'	Extent (ft between cracks): High < 50'
Low-Cracks < 1/4"	1	2	3
Med-Cracks 1/4-3/4"	4	5	6
High-Cracks > 3/4"	7	8	9

Utility Cuts

Severity	Extent (Length): Low <10%	Extent (Length): Med 10-30%	Extent (Length): High >30%
Low-Cracks < 1/4"	1	2	3
Med-Cracks 1/4-3/4"	4	5	6
High-Cracks > 3/4"	7	8	9

Drainage/Roughness/Rutting

Condition	Severity	Description
No Defects	0	Wide, deep ditches with no obstructions, smooth ride, no rutting, no potholes.
Minor Defects	1	Drainage may be obstructed, < 1" rutting, minor roughness.
Moderate Defects	2	Poor drainage, 1-2" rutting, noticeable roughness, potholes < 6" wide.
Major Defects	3	No drainage; > 2" rutting; potholes 6-12" wide create roughness requiring reduced speeds.

CONCRETE RATING SHEET

Spalling of Joints

Extent (% joints)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low Spalls < 3"	1	2	3
	Med Spalls 3-6"	4	5	6
	High Spalls > 6"	7	8	9

Broken Slabs

Extent (% slabs)

Severity	No Defects	Low <5%	Med 5-15%	High >15%
	Low-no more than 3 pieces, no spalling/faulting	1	2	3
	Med-broken into >3 pieces, spalling/faulting <1/4"	4	5	6
	High-4 or more pieces, spalling/faulting >1/4"	7	8	9

Transverse Cracks

Extent (% slabs)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/4"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/4"	7	8	9

Joint Seal Damage

Extent (%joints)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low <10% joint length	1	2	3
	Med 10-50% joint length	4	5	6
	High >50% joint length	7	8	9

Faulting

Extent (Length)

Severity	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 1/2"	1	2	3
	Med 1/2-1"	4	5	6
	High > 1"	7	8	9

Patch Deterioration

Extent (Area)

Severity	No Defects	Low <10%	Med 10-30%	High >30%
	Low-no fault, no settle at perimeter	1	2	3
	Med-fault & settle <1/4" at perimeter	4	5	6
	High-fault & settle >1/4" at perimeter, cracked patch	7	8	9

Corner Breaks

Extent (% of slabs)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-corner cracks, no spalling or faulting	1	2	3
	Med-crack slightly spalled & faulted <1/4"	4	5	6
	High-crack highly spalled & faulted >1/4"	7	8	9

Longitudinal Cracks

Extent (% slabs)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/2"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/2"	7	8	9

Map Cracks

Extent (Area)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-small connected cracks, no spalling	1	2	3
	Med-connected cracks, no spalling	4	5	6
	High-large connected cracks with surface spalling	7	8	9

Deficiency Ratings With Associated Remaining Service Life

Asphalt Rating Sheet

Fatigue Cracking	
Distress Rating	Remaining Service Life
0	20
1	10
2	8
3	6
4	8
5	6
6	4
7	6
8	2
9	0

Edge Cracking	
Distress Rating	Remaining Service Life
0	20
1	12
2	10
3	8
4	10
5	8
6	6
7	8
8	6
9	4

Transverse Cracking	
Distress Rating	Remaining Service Life
0	20
1	14
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	2

Utility Cuts	
Distress Rating	Remaining Service Life
0	20
1	14
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	2

Longitudinal Cracking	
Distress Rating	Remaining Service Life
0	20
1	14
2	12
3	10
4	12
5	10
6	8
7	10
8	8
9	6

Block Cracking	
Distress Rating	Remaining Service Life
0	20
1	12
2	10
3	8
4	10
5	8
6	6
7	12
8	6
9	2

Drainage/Roughness/Rutting	
Distress Rating	Remaining Service Life
0	20
1	16
2	10
3	4

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Asphalt & Concrete Roads)

RSL	FAILED 0	POOR 1 - 6	FAIR 7 - 12	GOOD 13 - 18	EXCELLENT 19 - 20

Concrete Rating Sheet

Spalling	
Distress Rating	Remaining Service Life
0	20
1	15
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	0

Broken Slabs	
Distress Rating	Remaining Service Life
0	20
1	15
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	0

Transverse Cracks	
Distress Rating	Remaining Service Life
0	20
1	18
2	15
3	12
4	15
5	10
6	6
7	10
8	4
9	0

Joint Seal Damage	
Distress Rating	Remaining Service Life
0	20
1	16
2	14
3	12
4	14
5	10
6	8
7	12
8	8
9	6

Faulting	
Distress Rating	Remaining Service Life
0	20
1	15
2	12
3	10
4	12
5	8
6	6
7	10
8	4
9	0

Patch Deterioration	
Distress Rating	Remaining Service Life
0	18
1	16
2	14
3	12
4	12
5	10
6	8
7	10
8	6
9	0

Corner Breaks	
Distress Rating	Remaining Service Life
0	18
1	16
2	14
3	12
4	12
5	10
6	8
7	10
8	6
9	0

Longitudinal Cracks	
Distress Rating	Remaining Service Life
0	20
1	18
2	15
3	12
4	15
5	10
6	6
7	10
8	4
9	0

Map Cracks	
Distress Rating	Remaining Service Life
0	20
1	18
2	15
3	12
4	12
5	10
6	6
7	10
8	4
9	0

Deficiency Ratings With Associated Remaining Service Life

Native Primitive Improved Rating Sheet

Cross Section	
Distress Rating	Remaining Service Life
0	10
1	7
2	5
3	0

Rutting	
Distress Rating	Remaining Service Life
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Roadside Drainage	
Distress Rating	Remaining Service Life
0	10
1	8
2	4
3	0

Potholes	
Distress Rating	Remaining Service Life
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Dust	
Distress Rating	Remaining Service Life
0	10
1	8
2	6
3	2

Corrugations	
Distress Rating	Remaining Service Life
0	10
1	9
2	7
3	7
4	6
5	5
6	5
7	4
8	3
9	0

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Gravel & Native Roads)

RSL	FAILED 0	POOR 1 - 2	FAIR 3 - 4	GOOD 5 - 7	EXCELLENT 8 - 10

Gravel Rating Sheet

Cross Section	
Distress Rating	Remaining Service Life
0	10
1	7
2	5
3	0

Rutting	
Distress Rating	Remaining Service Life
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Roadside Drainage	
Distress Rating	Remaining Service Life
0	10
1	8
2	4
3	0

Potholes	
Distress Rating	Remaining Service Life
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Dust	
Distress Rating	Remaining Service Life
0	10
1	8
2	6
3	2

Corrugations	
Distress Rating	Remaining Service Life
0	10
1	9
2	7
3	7
4	6
5	5
6	5
7	4
8	3
9	0

Loose Aggregate	
Distress Rating	Remaining Service Life
0	10
1	9
2	8
3	7
4	8
5	7
6	6
7	5
8	3
9	0