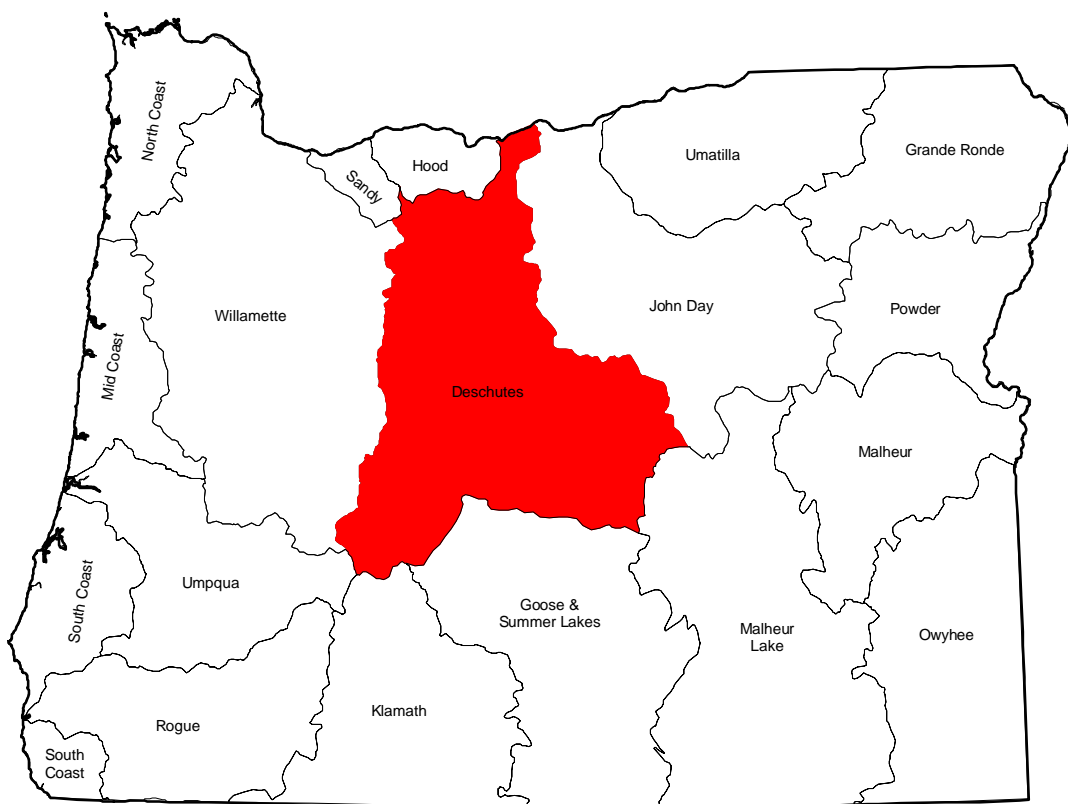




State of Oregon  
Department of  
Environmental  
Quality



## **LOWER DESCHUTES RIVER GEOGRAPHIC RESPONSE PLAN (GRP)**



## Spill Response Contact Sheet

### Notifications For Hazardous Substance Or Oil Spills

National Response Center	(800) 424-8802
Oregon Emergency Response System (OERS)	(800) 452-0311
	(800) OILS-911

#### Environmental Protection Agency (EPA)

National Response Center	(800) 424-8802
Region 10 Spill Response	(206) 553-1263
Oregon Ops Office	(503) 326-3250

#### U.S. Coast Guard

Marine Safety Office Portland	
Watchstander	(503) 240-9301
Port Operations	(503) 240-9379
Pacific Strike Team	(415) 883-3311
District 13:	
MEP	(206) 220-7210
Command Center	(206) 220-7001
Safety Officer	(206) 220-7242
Public Affairs	(206) 220-7237

#### National Oceanic Atmosphere Administration

Scientific Support Coordinator	(206) 526-6829
Weather	(206) 526-6087

#### Department of the Interior

Regional Environmental Officer	
Preston Sleeper	(503) 231-6157
Allison O'Brien	(503) 231-6157
Bureau of Land Management	
District HazMat Coordinator	
Larry Thomas	(541) 416-6734
Deschutes Resource Area Field Manager	
Robert Towne	(541) 416-6766
Lower Deschutes River Manager	
Lynette Ripley	(541) 416-6781
Central Oregon Interagency Dispatch Center	
	(541) 416-6800

#### Oregon State

Emergency Response System (OERS)	(800) 452-0311
	(503) 378-6377
	(800) OILS-911
Department of Environmental Quality	
Headquarters (Portland)	(503) 229-5153
Northwest Region (Portland)	(503) 229-5263
Eastern Region (Bend)	(541) 338-6146
Eastern Region (Pendleton)	(541) 278-4063
State Historic Preservation Officer – contact via OERS	
Oregon Department of Fish and Wildlife – contact via OERS	

#### Local Government

City of Maupin	(541) 395-2698
Sherman County	(541) 565-3100
Wasco County	(541) 506-2500

#### Burlington Northern Santa Fe Railway

Emergency Response	(800) 832-5452
--------------------	----------------

#### Portland General Electric

Emergency	(503) 464-8343
Pelton Dam	
Control Room	(541) 475-2277

#### Fish Hatcheries

Warm Springs National Fish Hatchery	(541) 553-1692, x22
Oak Springs Hatchery	(541) 395-2546
Round Butte Hatchery	(541) 475-6393

#### Response Contractors

Clean Rivers Cooperative	(503) 220-2040
Cowlitz Clean Sweep, Inc.	(360) 423-6316
National Response Corporation Environmental	(503) 283-1150
	(800) 337-7455
Fred Devine	(503) 283-5285
Global Diving and Salvage	(206) 623-0621
Rick Franklin Corporation	(800) 428-1516
	(541) 451-1275
Tidewater Environmental	(503) 289-4274

#### Confederated Tribes of the Warm Springs

Chief of Police:			
Don Courtney		(541) 553-1171	
Chief of Fire & Safety:			
Dan Martinez		(541) 553-1634	
Tribal Historic Preservation Officer:			
Sally Bird	Work	(541) 553-2002	
	Cell	(541) 980-9802	
	Home	(541) 475-1899	
THPO (alternate):			
Maralee Wernz	Cell	(541) 980-9802	
	Home	(541) 475-1899	
Environmental Resources:			
Richard Craig	Work	(541) 553-2018	
	Cell	(541) 419-8386	
	Home	(541) 553-2018	
Bureau of Indian Affairs:			
Jerry Henricksen	Cell	(541) 980-3038	

**Boldface type is a 24-hour number.**



## HOW TO USE THIS GEOGRAPHIC RESPONSE PLAN

### Purpose of Geographic Response Plan (GRP)

**This plan prioritizes resources to be protected and allows for immediate and proper action. By using this plan, the first responders to a spill can avoid the initial confusion that generally accompanies any spill.**

GRPs are used during the initial phase of a spill that lasts from the time a spill occurs until the Unified Command is operating and/or the spill has been contained and cleaned up. Generally this lasts no longer than 24 hours. GRPs constitute the federal and state on-scene coordinators' (OSC's) "orders" during the initial phase of the spill. During the project phase, the GRP will continue to be used, but with input from natural resource trustees.

### Strategy Selection

[Chapter 4.1](#) of the GRP contains complete strategy descriptions in matrix form and response priorities. The accompanying maps are located in [Chapter 4.2](#). The strategies depicted in Chapter 4.2 will be implemented after reviewing on-scene information, including: river currents, weather conditions, oil type, initial trajectories, etc.

[Chapter 6](#) outlines the sensitive resources requiring protection and the seasonality of their sensitivity. This information must be consulted before strategies are implemented, as there may be flight restrictions associated with a resource. Flight restriction information is also found in Chapter 6.

### Standardized Response Language

In order to avoid confusion in response terminology, this GRP uses strategy names defined in [Appendix A](#) (e.g., diversion booming, deflection booming).

### Response Equipment

A table outlining equipment availability and response times is preliminary for this GRP. In the interim, strategies will be deployed in the order equipment arrives on scene and as directed/selected by the on-scene coordinator.

## Record of Changes

[illegible]

**Lower Deschutes River Geographic Response Plan  
Table of Contents**

<b>1.</b>	<b>Introduction: Scope of this Project.....</b>	<b>1-1</b>
<b>2.</b>	<b>Site Description.....</b>	<b>2-1</b>
2.1	Physical Features.....	2-1
2.2	Hydrology .....	2-1
2.3	Climate .....	2-1
	Table 2-1. Lower Deschutes River climate.....	2-1
2.4	Risk Assessment.....	2-2
<b>3.</b>	<b>Reference Map.....</b>	<b>3-1</b>
	Figure 3-1. Vicinity map of the Lower Deschutes River Geographic Response Plan .....	3-1
<b>4.</b>	<b>General Protection/Collection Strategies .....</b>	<b>4-1</b>
4.1	Chapter Overview .....	4-1
4.2	Strategy Locations and Descriptions.....	4-2
	<b>Sector 1 – Strategies 0.0 through 12.0 .....</b>	<b>4-3</b>
	Figure 4a. Sector 1 (Strategies 0.0 – 12.0) index map of the Lower Deschutes River Geographic Response Plan.....	4-3
	Table 4a. Strategies D-204.5 to 12.0 – Booming Strategies and Resources Protected.....	4-4
	Figure 4-1a. Strategies D-204.5 and 0.4 - Topographic Map.....	4-5
	Figure 4-1b. Strategies D-204.5 and 0.4 - Aerial Photograph.....	4-6
	Table 4-1. Strategies D-204.5 and 0.4 – Booming Strategies and Resources Protected.....	4-7
	Photograph: RM 0.4a.....	4-7
	Photograph: RM 0.4b.....	4-7
	Figure 4-2a. Strategy 3.9 - Topographic Map.....	4-8
	Figure 4-2b. Strategy 3.9 - Aerial Photograph.....	4-9
	Table 4-2. Strategy 3.9 – Booming Strategies and Resources Protected .....	4-10
	Photograph: RM 3.9a.....	4-10
	Photograph: RM 3.9b.....	4-10
	Figure 4-3a. Strategy 5.8 - Topographic Map.....	4-11
	Figure 4-3b. Strategy 5.8 - Aerial Photograph.....	4-12
	Table 4-3. Strategy 5.8 – Booming Strategies and Resources Protected .....	4-13
	Photograph: RM 5.8a.....	4-13
	Photograph: RM 5.8b.....	4-13
	Figure 4-4a. Strategy 8.6 - Topographic Map.....	4-14
	Figure 4-4b. Strategy 8.6 - Aerial Photograph.....	4-15
	Table 4-4. Strategy 8.6 – Booming Strategies and Resources Protected .....	4-16
	Photograph: RM 8.6a.....	4-16

## Lower Deschutes River Geographic Response Plan

Photograph: RM 8.6b.....	4-16
Figure 4-5a. Strategy 12.0 - Topographic Map.....	4-17
Figure 4-5b. Strategy 12.0 - Aerial Photograph.....	4-18
Table 4-5. Strategy 12.0 – Booming Strategies and Resources Protected .....	4-19
Photograph: RM 12.0a.....	4-19
Photograph: RM 12.0b.....	4-19
<b>Sector 2 – Strategies 25.8 through 39.3 .....</b>	<b>4-20</b>
Figure 4b. Sector 2 (Strategies 25.8 – 39.3) index map of the Lower Deschutes River Geographic Response Plan.....	4-20
Table 4b. Strategies 25.8 to 39.3 – Booming Strategies and Resources Protected .....	4-21
Figure 4-6a. Strategy 25.8 - Topographic Map.....	4-22
Figure 4-6b. Strategy 25.8 - Aerial Photograph.....	4-23
Table 4-6. Strategy 25.8 – Booming Strategies and Resources Protected .....	4-24
Photograph: RM 25.8a.....	4-24
Photograph: RM 25.8b.....	4-24
Figure 4-7a. Strategy 27.0 - Topographic Map.....	4-25
Figure 4-7b. Strategy 27.0 - Aerial Photograph.....	4-26
Table 4-7. Strategy 27.0 – Booming Strategies and Resources Protected .....	4-27
Photograph: RM 27.0a.....	4-27
Photograph: RM 27.0b.....	4-27
Figure 4-8a. Strategy 28.9 - Topographic Map.....	4-28
Figure 4-8b. Strategy 28.9 - Aerial Photograph.....	4-29
Table 4-8. Strategy 28.9 – Booming Strategies and Resources Protected .....	4-30
Photograph: RM 28.9a.....	4-30
Photograph: RM 28.9b.....	4-30
Figure 4-9a. Strategy 30.2 - Topographic Map.....	4-31
Figure 4-9b. Strategy 30.2 - Aerial Photograph.....	4-32
Table 4-9. Strategy 30.2 – Booming Strategies and Resources Protected .....	4-33
Photograph: RM 30.2a.....	4-33
Photograph: RM 30.2b.....	4-33
Figure 4-10a. Strategy 34.8 - Topographic Map.....	4-34
Figure 4-10b. Strategy 34.8 - Aerial Photograph.....	4-35
Table 4-10. Strategy 34.8 – Booming Strategies and Resources Protected .....	4-36
Photograph: RM 34.8a.....	4-36
Photograph: RM 34.8b.....	4-36
Figure 4-11a. Strategy 35.8 - Topographic Map.....	4-37

## Lower Deschutes River Geographic Response Plan

Figure 4-11b. Strategy 35.8 - Aerial Photograph.....	4-38
Table 4-11. Strategy 35.8 – Booming Strategies and Resources Protected .....	4-39
Photograph: RM 35.8a.....	4-39
Photograph: RM 35.8b.....	4-39
Figure 4-12a. Strategy 39.3 - Topographic Map.....	4-40
Figure 4-12b. Strategy 39.3 - Aerial Photograph.....	4-41
Table 4-12. Strategy 39.3 – Booming Strategies and Resources Protected .....	4-42
Photograph: RM 39.3a.....	4-42
Photograph: RM 39.3b.....	4-42
<b>Sector 3</b> – Strategies 42.8 through 59.0 .....	4-43
Figure 4c. Sector 3 (Strategies 42.8 – 59.0) index map of the Lower Deschutes River Geographic Response Plan.....	4-43
Table 4c. Strategies 42.8 through 59.0 – Booming Strategies and Resources Protected.....	4-44
Figure 4-13a. Strategies 42.8 and 43.2 - Topographic Map.....	4-45
Figure 4-13b. Strategies 42.8 and 43.2 - Aerial Photograph.....	4-46
Table 4-13. Strategies 42.8 and 43.2 – Booming Strategies and Resources Protected .....	4-47
Photograph: RM 42.8a.....	4-47
Photograph: RM 42.8b.....	4-47
Photograph: RM 43.2.....	4-48
Figure 4-14a. Strategy 44.2 - Topographic Map.....	4-49
Figure 4-14b. Strategy 44.2 - Aerial Photograph.....	4-50
Table 4-14. Strategy 44.2 – Booming Strategies and Resources Protected .....	4-51
Photograph: RM 44.2a.....	4-51
Photograph: RM 44.2b.....	4-51
Figure 4-15a. Strategy 45.4 - Topographic Map.....	4-52
Figure 4-15b. Strategy 45.4 - Aerial Photograph.....	4-53
Table 4-15. Strategy 45.4 – Booming Strategies and Resources Protected .....	4-54
Photograph: RM 45.4a.....	4-54
Photograph: RM 45.4b.....	4-54
Figure 4-16a. Strategy 49.3 - Topographic Map.....	4-55
Figure 4-16b. Strategy 49.3 - Aerial Photograph.....	4-56
Table 4-16. Strategy 49.3 – Booming Strategies and Resources Protected .....	4-57
Photograph: RM 49.3a.....	4-57
Photograph: RM 49.3b.....	4-57
Figure 4-17a. Strategy 50.0 - Topographic Map.....	4-58
Figure 4-17b. Strategy 50.0 - Aerial Photograph.....	4-59

## Lower Deschutes River Geographic Response Plan

Table 4-17. Strategy 50.0 – Booming Strategies and Resources Protected .....	4-60
Photograph: RM 50.0a.....	4-60
Photograph: RM 50.0b.....	4-60
Figure 4-18a. Strategy 51.8 - Topographic Map.....	4-61
Figure 4-18b. Strategy 51.8 - Aerial Photograph.....	4-62
Table 4-18. Strategy 51.8 – Booming Strategies and Resources Protected .....	4-63
Photograph: RM 51.8a.....	4-63
Photograph: RM 51.8b.....	4-63
Figure 4-19a. Strategy 55.8 - Topographic Map.....	4-64
Figure 4-19b. Strategy 55.8 - Aerial Photograph.....	4-65
Table 4-19. Strategy 55.8 – Booming Strategies and Resources Protected .....	4-66
Photograph: RM 55.8a.....	4-66
Photograph: RM 55.8b.....	4-66
Figure 4-20a. Strategy 59.0 - Topographic Map.....	4-67
Figure 4-20b. Strategy 59.0 - Aerial Photograph.....	4-68
Table 4-20. Strategy 59.0 – Booming Strategies and Resources Protected .....	4-69
Photograph: RM 59.0a.....	4-69
Photograph: RM 59.0b.....	4-69
<b>Sector 4 – Strategies 63.2 through 74.5 .....</b>	<b>4-70</b>
Figure 4d. Sector 4 (Strategies 63.2 – 74.5) index map of the Lower Deschutes River Geographic Response Plan.....	4-70
Table 4d. Strategies 63.2 through 74.5 – Booming Strategies and Resources Protected.....	4-71
Figure 4-21a. Strategy 63.2 - Topographic Map.....	4-72
Figure 4-21b. Strategy 63.2 - Aerial Photograph.....	4-73
Table 4-21. Strategy 63.2 – Booming Strategies and Resources Protected .....	4-74
Photograph: RM 63.2a.....	4-74
Photograph: RM 63.2b.....	4-74
Figure 4-22a. Strategy 65.3 - Topographic Map.....	4-75
Figure 4-22b. Strategy 65.3 - Aerial Photograph.....	4-76
Table 4-22. Strategy 65.3 – Booming Strategies and Resources Protected .....	4-77
Photograph: RM 65.3a.....	4-77
Photograph: RM 65.3b.....	4-77
Figure 4-23a. Strategy 69.2 - Topographic Map.....	4-78
Figure 4-23b. Strategy 69.2 - Aerial Photograph.....	4-79
Table 4-23. Strategy 69.2 – Booming Strategies and Resources Protected .....	4-80
Photograph: RM 69.2a.....	4-80



## Lower Deschutes River Geographic Response Plan

Photograph: RM 69.2b.....	4-80
Figure 4-24a. Strategies 72.0, 72.5, 73.0, and 73.5 - Topographic Map.....	4-81
Figure 4-24b. Strategies 72.0, 72.5, 73.0, and 73.5 - Aerial Photograph.....	4-82
Table 4-24. Strategies 72.0, 72.5, 73.0, and 73.5 – Booming Strategies and Resources Protected.....	4-83
Photograph: RM 72.0a.....	4-84
Photograph: RM 72.0b.....	4-84
Photograph: RM 72.5a.....	4-85
Photograph: RM 72.5b.....	4-85
Photograph: RM 73.0a.....	4-86
Photograph: RM 73.0b.....	4-86
Photograph: RM 73.5a.....	4-87
Photograph: RM 73.5b.....	4-87
Figure 4-25a. Strategy 74.2 - Topographic Map.....	4-88
Figure 4-25b. Strategy 74.2 - Aerial Photograph.....	4-89
Table 4-25. Strategy 74.2 – Booming Strategies and Resources Protected .....	4-90
Photograph: RM 74.2a.....	4-90
Photograph: RM 74.2b.....	4-90
Figure 4-26a. Strategy 74.5 - Topographic Map.....	4-91
Figure 4-26b. Strategy 74.5 - Aerial Photograph.....	4-92
Table 4-26. Strategy 74.5 – Booming Strategies and Resources Protected .....	4-93
Photograph: RM 74.5a.....	4-93
Photograph: RM 74.5b.....	4-93
<b>Sector 5 – Strategies 84.0 through 97.2 .....</b>	<b>4-94</b>
Figure 4e. Sector 5 (Strategies 84.0 – 97.2) index map of the Lower Deschutes River Geographic Response Plan.....	4-94
Table 4e. Strategies 84.0 through 97.2 – Booming Strategies and Resources Protected.....	4-95
Figure 4-27a. Strategy 84.0 - Topographic Map.....	4-97
Figure 4-27b. Strategy 84.0 - Aerial Photograph.....	4-98
Table 4-27. Strategy 84.0 – Booming Strategies and Resources Protected .....	4-99
Photograph: RM 84.0a.....	4-99
Photograph: RM 84.0b.....	4-99
Figure 4-28a. Strategy 85.0 - Topographic Map.....	4-100
Figure 4-28b. Strategy 85.0 - Aerial Photograph.....	4-101
Table 4-28. Strategy 85.0 – Booming Strategies and Resources Protected .....	4-102
Photograph: RM 85.0a.....	4-102
Photograph: RM 85.0b.....	4-102

## Lower Deschutes River Geographic Response Plan

Figure 4-29a. Strategy 88.0 - Topographic Map.....	4-103
Figure 4-29b. Strategy 88.0 - Aerial Photograph.....	4-104
Table 4-29. Strategy 88.0 – Booming Strategies and Resources Protected .....	4-105
Photograph: RM 88.0a.....	4-105
Photograph: RM 88.0b.....	4-105
Figure 4-30a. Strategy 88.4 - Topographic Map.....	4-106
Figure 4-30b. Strategy 88.4 - Aerial Photograph.....	4-107
Table 4-30. Strategy 88.4 – Booming Strategies and Resources Protected .....	4-108
Photograph: RM 88.4a.....	4-108
Photograph: RM 88.4b.....	4-108
Figure 4-31a. Strategy 89.0 - Topographic Map.....	4-109
Figure 4-31b. Strategy 89.0 - Aerial Photograph.....	4-110
Table 4-31. Strategy 89.0 – Booming Strategies and Resources Protected .....	4-111
Photograph: RM 89.0a.....	4-111
Photograph: RM 89.0b.....	4-111
Figure 4-32a. Strategy 94.2 - Topographic Map.....	4-112
Figure 4-32b. Strategy 94.2 - Aerial Photograph.....	4-113
Table 4-32. Strategy 94.2 – Booming Strategies and Resources Protected .....	4-114
Photograph: RM 94.2a.....	4-114
Photograph: RM 94.2b.....	4-114
Figure 4-33a. Strategies 96.0 and 96.2 - Topographic Map.....	4-115
Figure 4-33b. Strategies 96.0 and 96.2 - Aerial Photograph.....	4-116
Table 4-33. Strategies 96.0 and 96.2 – Booming Strategies and Resources Protected.....	4-117
Photograph: RM 96.0a.....	4-117
Photograph: RM 96.0b.....	4-117
Figure 4-34a. Strategies 96.7, 96.9, and 97.2 - Topographic Map.....	4-118
Figure 4-34b. Strategies 96.7, 96.9, and 97.2 - Aerial Photograph.....	4-119
Table 4-34. Strategies 96.7, 96.9, and 97.2 – Booming Strategies and Resources Protected .....	4-120
Photograph: RM 96.7.....	4-120
Photograph: RM 96.9.....	4-120
4.3 Protection/Collection Priorities for Deschutes River Scenarios.....	4-121
Table 4-35. Oil moving downstream. ....	4-121
<b>5. Shoreline Countermeasures .....</b>	<b>5-1</b>
5.1 Chapter Overview .....	5-1
5.2 Shoreline Type Photos .....	5-1
5.3 Oil Countermeasure Matrix.....	5-1

## Lower Deschutes River Geographic Response Plan

Table 5-1. Very Light Oil (Jet fuels, Gasoline) .....	5-5
Table 5-2. Light Oil (Diesel, No 2 Fuel Oils, Light Crudes) .....	5-6
Table 5-3. Medium Oil (Most Crude Oils & Some Heavily Weathered Light Crudes) .....	5-7
Table 5-4. Crude Oils, Intermediate Fuel Oils, Bunker C & Heavily Weathered Medium Crudes) .....	5-8
<b>6. Sensitive Resource/Wildlife Flight Restriction Information .....</b>	<b>6-1</b>
6.1 Fish .....	6-1
Table 6.1. Life cycles of selected fish species in the Lower Deschutes River.....	6-2
6.2 Mammals .....	6-5
6.3 Marine Mammals .....	6-6
6.4 Birds .....	6-6
Figure 6-1. Bald eagle nest sightings and flight restrictions along the Lower Deschutes River .....	6-7
6.5 Flight Restriction Zones/Sensitive Wildlife .....	6-8
Table 6-2. Wildlife Resource/Flight Restriction Table.....	6-8
6.6 Hazing .....	6-8
6.7 Archeological Sites .....	6-9
<b>7. Logistical Information .....</b>	<b>7-1</b>
Table 7-1. Logistical Information. ....	7-1
<b>Appendix A: Protection Techniques .....</b>	<b>A-1</b>
A-1. Summary of Protection Techniques .....	A-1
A-2. Fast Water Booming Techniques: Current Chip Log and Maximum Boom Deflection Angle .....	A-3
A-3. Current Drag Force on One-Foot Boom Profile to Current .....	A-4
A-4. Approximate Safe Working Loads/Tensile Strength of New Rope .....	A-5
A-5. Approximate Water Travel Time Between Various Points Along the Lower Deschutes River .....	A-6
<b>Appendix B: Geographic Response Plan Contributors.....</b>	<b>B-1</b>
<b>Appendix C: Geographic Response Plan Comments/Corrections/Suggestions .....</b>	<b>C-1</b>

# **Lower Deschutes River, Oregon**

## **GEOGRAPHIC RESPONSE PLAN**

### **1. Introduction: Scope of this Project**

Geographic Response Plans (GRPs) are intended to help first responders to a spill avoid the initial confusion that generally accompanies any spill. They prioritize resources to be protected and allow for immediate and proper action.

GRPs are developed for marine waters of Washington and Oregon State, the Columbia River, and the inland areas of Washington, Oregon and Idaho. They are prepared through the efforts of the Washington Department of Ecology, Oregon Department of Environmental Quality, Idaho State Emergency Response Commission, the U.S. Coast Guard, and the U.S. Environmental Protection Agency.

GRPs are developed through workshops involving federal, state, and local oil spill emergency response experts; representatives from tribes, industry, ports, and environmental organizations; pilots; and response contractors. Workshop participants identify resources that require protection, develop operational strategies, and pinpoint logistical support.

The first goal of a GRP is to identify resources, physical features, hydrology, currents, winds, and climate that may affect response strategies. After compiling this information, sensitive resources are identified.

Secondly, response strategies are developed based on the sensitive resources noted, hydrology, and climatic considerations. Individual response strategies identify the amount and type of equipment necessary for implementation. The response strategies are then applied to likely spill scenarios for oil movement, taking into account factors such as wind and currents.

Finally, additional logistical support is identified, including:

- Location of operations centers for the central response organization
- Local equipment and trained personnel
- Local facilities and services and appropriate contacts for each.

## 2. Site Description

The entire Deschutes River Basin covers 10,500 square miles of North Central Oregon, approximately 11 percent of the state. The Deschutes River is 252 miles long; a network of 6,800 miles of streams drain the basin, only 1,980 miles of which are perennial. The basin extends from the high Cascade Mountains on the west, lava plateaus to the south, the Ochoco Mountains and the plateau between the Deschutes and John Day basins to the east, and the Columbia River to the north. Its headwaters are in the Three Sisters area of the Cascade Mountains Basin elevation ranges from over 4,500 feet in the Cascades to 160 feet above sea level at the Columbia. The basin encompasses nearly all of Crook, Deschutes, and Jefferson Counties, 70 percent of Wasco County, and half of Sherman County. Small parts of Klamath, Wheeler, Grant, Lake, Hood River, and Harney Counties also lie within the basin. This GRP covers the lower 100 miles of the Deschutes River.

Agriculture, forest products, and recreation form the economic base of the Deschutes Basin. Livestock operation, particularly cattle ranching, account for over half of the total agricultural income. The river is one of the most popular recreation resources in the state and is heavily used for rafting, angling, and camping. The lower Deschutes River from Pelton Dam to the Columbia River (excluding the City of Maupin) is an Oregon Scenic Waterway.

### 2.1 Physical Features

Various sedimentary formations and lava flows make up the geology of the basin. Over half of the land in the Deschutes Basin is classified as forest lands that extend over most of the slopes of the Cascades, east to the Paulina Mountains, and Walker Rim and cover a large portion of Ochoco and Maury Mountains. Agricultural lands comprise less than 10 percent of the basin area. They are generally irrigated in the central Deschutes area, with dry farming methods practiced in the lower basin. The rest of the basin is mostly rangeland. Urban areas cover less than 1 percent of the basin area.

### 2.2 Hydrology

The average annual discharge of the Deschutes River 1.4 miles from the mouth near Biggs is 5,848 cubic feet per second (cfs). Discharge varies seasonally; the average monthly discharge is 7,786 cfs in January and 4,439 cfs in August. Upstream near Culver, at mile 120, the average annual discharge is 905 cfs, ranging from 1,416 cfs in February to 529 cfs in August. Tributaries originating in the Cascades have relatively stable flow due to groundwater storage and release as baseflow. Crooked River and Trout Creek drain the more arid eastern portion of the basin and have relatively lower summer flows and higher flood periods in the spring. The main stem of the Deschutes River and lower Crooked River are regulated by irrigation reservoirs. The river is fully appropriated. Minimum flows were established in 1921 to provide additional water for fish life and municipal and industrial requirements. NOAA maintains a river gauge near the Deschutes River confluence with the Columbia at Moody near Biggs (MOD03). Real-time flow data may be obtained at [www.nwrfc.noaa.gov/river/station/flowplot/flowplot.cgi?MOD03](http://www.nwrfc.noaa.gov/river/station/flowplot/flowplot.cgi?MOD03).

### 2.3 Climate

The climate in the basin is continental, with cold winters and warm dry summers (Table 2-1). Average annual precipitation varies with elevation from about 100 inches in the Cascades to about 10 inches in the Deschutes Valley. Snowfall ranges from 295 inches at the Cascade Summit to 19 inches at Moro, and 11 inches at Madras. Only 25 percent of the average annual precipitation falls in the growing season from May to September. The average annual temperature ranges from 40 degrees Fahrenheit in the upper valleys to 51 degrees near the Columbia River. Growing season in the basin ranges from 80 to 170 days.

**Table 2-1. Lower Deschutes River climate**

Mean Temperature (1961-1990) (degrees Fahrenheit)

Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Moro	Mean Maximum	37.7	44.0	50.6	57.5	65.2	74.0	82.0	81.0	73.9	62.1	47.3	39.6	59.6
Moro	Mean Minimum	23.7	28.6	31.5	35.8	41.5	48.7	53.9	53.1	45.8	37.0	31.3	26.0	38.1
Moro	Monthly Mean	30.7	36.3	41.1	46.6	53.4	61.4	67.9	67.0	59.8	49.5	39.3	32.8	48.8

## Lower Deschutes River Geographic Response Plan

Mean precipitation (1961-1990) in inches

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Moro	1.60	.89	.98	.80	.75	.56	.27	.54	.42	.69	1.60	1.71	10.81

([http://www.ocs.orst.edu/pubftp/reports/zone/Zone\\_6\\_summary.html](http://www.ocs.orst.edu/pubftp/reports/zone/Zone_6_summary.html))

### 2.4 Risk Assessment

The Deschutes River canyon provides habitat for endangered species and is one of the most valuable and heavily used recreational areas in Oregon; fishing and water sport recreational use is intense. Land ownership is mixed federal, state, tribal, and private. Access to the canyon is limited, making response to any spill difficult. The Burlington Northern Santa Fe Railway, whose track parallels the river, is the primary oil spill risk.

Burlington Northern Santa Fe Railroad movements of hazardous substances through Maupin, Oregon, for 2003 were:

Class	Description	Total Loaded Trip Count
1	Explosives	0
2	Gases	2,903
3	Flammable and combustible liquids	3,237
4	Flammable solids	124
5.1	Oxidizers	250
6.1	Toxic materials	25
7	Radioactive	0
8	Corrosive materials	1,219
9	Miscellaneous dangerous goods	1,478
Total		9,236

Burlington Northern Santa Fe Railroad movements of selected specific hazardous substances through Maupin, Oregon, for 2003 included:

Description	Total Loaded Trip Count
1) Styrene Monomer, Inhibited	1,403
2) Elevated Temperature Liquid, N.O.S.	928
3) Liquefied Petroleum Gas	885
4) Sulfuric Acid	820
5) Propane	742
6) Fuel Oil	601
7) Diesel Fuel	599

In addition to the railroad, Highway 26, which crosses the river near Warm Springs at River Mile 97, carries truck traffic to inland Oregon. There are also bridges crossing the river at Maupin (River Mile 52) and at Sherars Bridge (River Mile 44), although the estimated amount of hazardous materials transported at these sites is minimal.

The Pelton Re-Regulating Dam, at approximately river mile 100 and run by Portland General Electric, maintains approximately 4,500 gallons of oil for use in transformers and turbines.



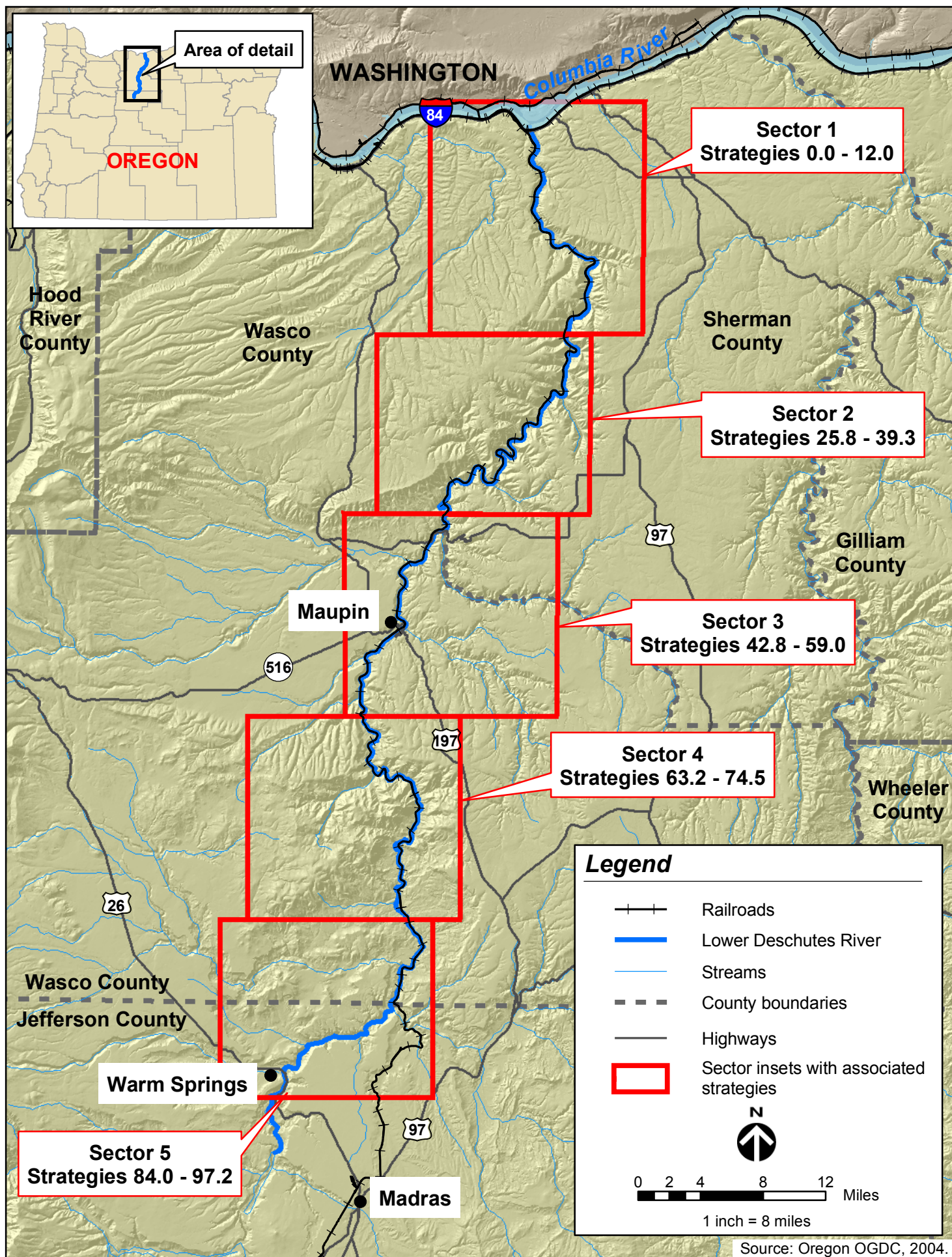


Figure 3-1. Vicinity map of the Lower Deschutes River Geographic Response Plan.

## 4. General Protection/Collection Strategies

### 4.1 Chapter Overview

This chapter details specific response strategies and the natural resources requiring protection, as outlined by participants of the GRP workshops for the lower Deschutes River. Other pertinent information necessary for proper implementation of scenarios is found in [Chapters 5 and 6](#), including shoreline types, wildlife areas, sensitive aquatic areas, archeological sites, and flight restriction zones that may be implemented by the OSC, if necessary.

#### Sectors

The lower Deschutes River geographic region is divided into five **sectors**, shown by the [reference map in Chapter 3](#).

#### Maps

The maps in this chapter provide information on specific locations of strategy points. They are designed to help the responder visualize response strategies in relation to valuable wildlife and archeological locations, economic areas, and sensitive aquatic areas. Maps under development will be added as they are completed and placed in their respective subject matter areas. For a complete list of all maps contained in this GRP, refer to the [Table of Contents](#).

**Protection/Collection maps** provide information on specific locations of strategy points. These maps are designed to help the responder visualize response strategies in relation to valuable wildlife and archeological locations, economic areas, and sensitive aquatic areas, and providing access information based on adjacent developed roads. Please note: river access is only shown on some maps.

**Booming Strategies and Resources Protected tables** provide information to support strategy implementation at each designated location, including strategy type, site access, and the resources of concern.

- **Scenario Response Priority Strategies** details the order in which strategies will be implemented based on a typical scenario.
- **Response Strategy Table** describes response strategy details, indicates the purpose of the strategy, and lists special considerations that may be needed to carry out the strategies.

#### Major Protection Techniques

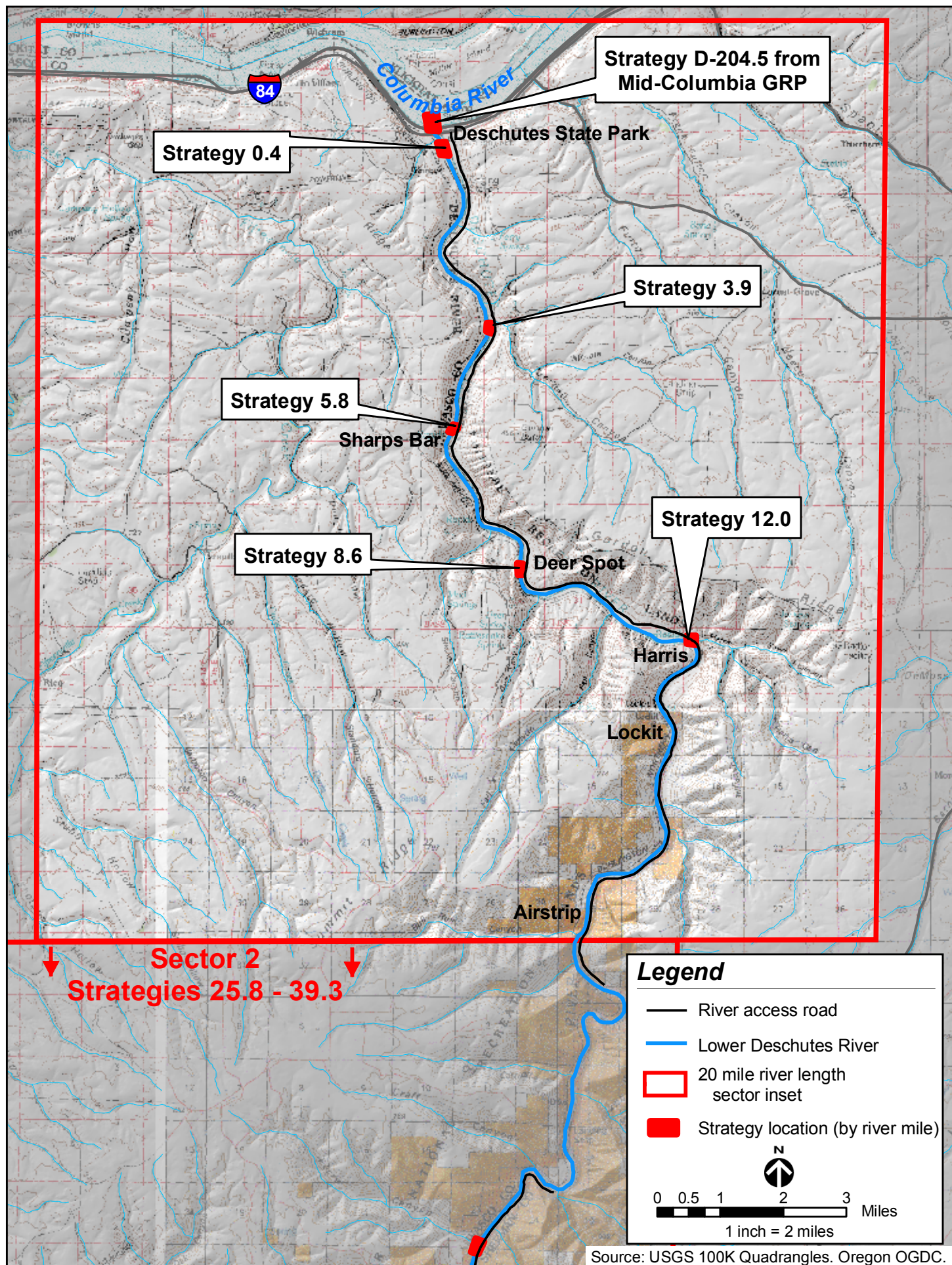
All response strategies fall into one of three major techniques that may be utilized either individually or in combination. The strategies listed in [Section 4-2](#) are based on one or more of the following techniques (Note: at this time, this GRP does not contain recommendations for the use of dispersants or in-situ burning. These techniques will only be used at the discretion of the Unified Command following guidelines from the NWACP.):

- **Mechanical Recovery Strategies**  
If a spill is too close to the shore for In Situ burning or dispersants, the key strategies are to use collection, diversion, or deflection booming to contain the slick and prevent it from entering areas with sensitive wildlife and fisheries resources. Booming strategies are described in detail in [Appendix A](#).
- **Dispersants**  
Chemical dispersants can be used to break up slicks on the water. Dispersants can decrease the severity of a spill by speeding the dissipation of certain oil types. Their use will require approval of the Unified Command. Dispersants will only be used in offshore situations under certain conditions, until the Area Committee makes further determinations and publishes them in the Area Contingency Plan.
- **In Situ Burning**  
If possible, an oil slick may be set on fire. Burning must be authorized by the Unified Command, who confer with state and local air and water quality authorities. This option is often preferable to allowing a slick to reach the shore. This method works on many types of oil, and requires special equipment, including a fire boom and ignitors. In Situ Burning will only be allowed when consistent with the Northwest Area Contingency Plan's In-Situ Burning Policy and Guidelines.

## **4.2 Strategy Locations and Descriptions**

The following response strategies and locations are organized by sector (index maps), river mile (strategy maps), and description (strategy tables).





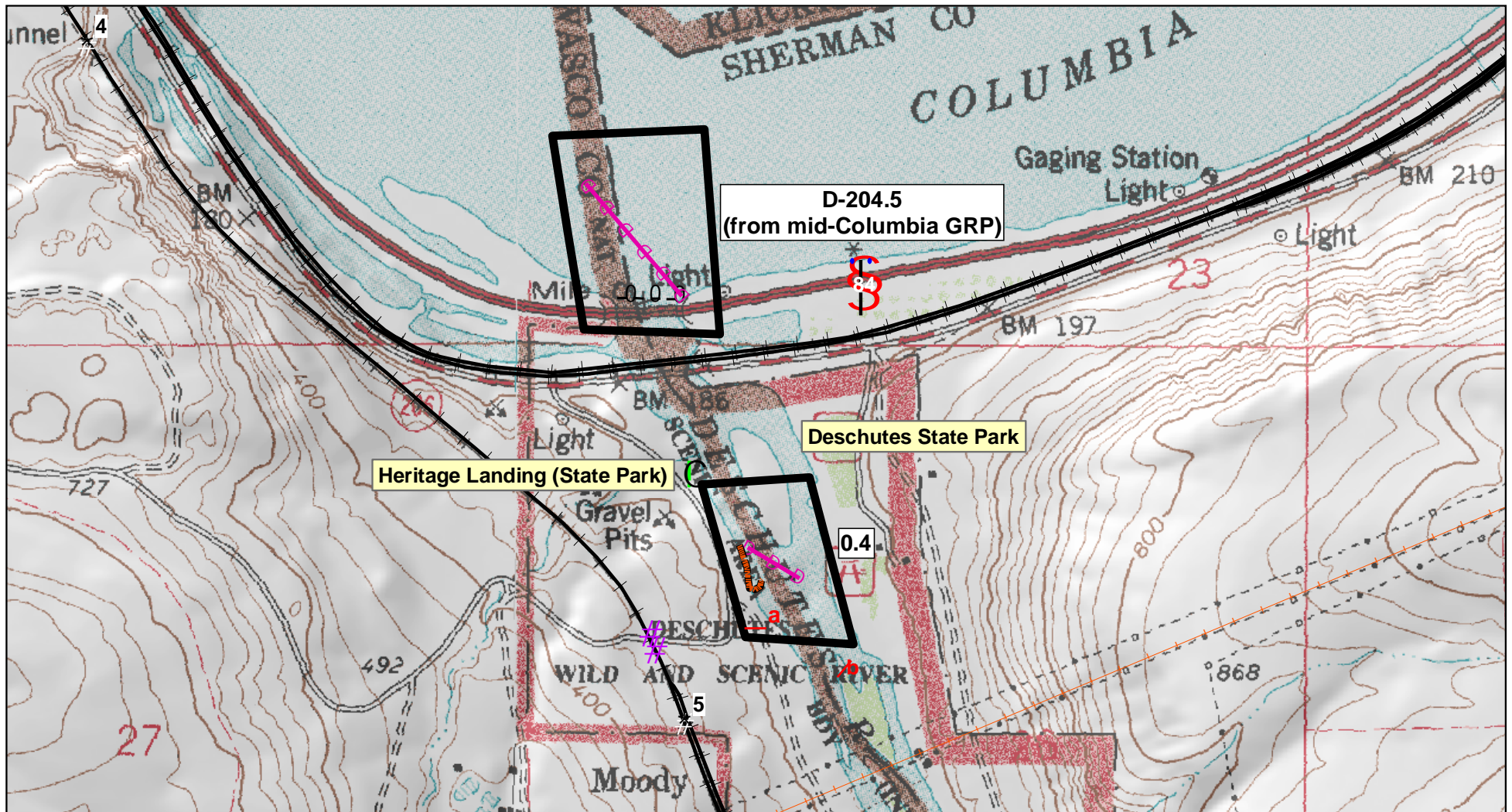
**Figure 4a. Sector 1 (Strategies 0.0 - 12.0) index map of the Lower Deschutes River Geographic Response Plan.**

## Lower Deschutes River Geographic Response Plan

**Table 4a. Strategies D-204.5 to 12.0 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">D-204.5</a>	Deflection / Diversion	(1) 500' (1) 1,000'	Use either 1,000' deflection to send oil into the main current or 500' exclusion tied to the RR trestle	Heritage Landing Park	I-84 to Exit 88 to Heritage Landing boat ramp	Deschutes River, Waterfowl	RR milepost 4.6 Mid-Columbia GRP response strategy designed to protect the Deschutes River from a spill in the Columbia River.	Unverified	-120.91341, 45.63689
<a href="#">RM 0.4</a>	Collection	(16) 50'	Use 16 sections of 50' collection boom off of west side boat ramp	Heritage Landing Park	I-84 to Heritage Landing Park	Waterfowl, downstream habitat, Columbia River	RR milepost 4.9 (road to rail access) This strategy is the first priority response to an incident on the Deschutes River.	Unverified	-120.90974, 45.63080
<a href="#">RM 3.9</a>	Collection	(12) 50'	Use 12 sections of 50' collection boom off of east bank	Colorado Camp	East bank of river, dirt road from Deschutes State Park approximately 3.6 miles to Colorado Camp	Waterfowl, downstream habitat, irrigation intake, Columbia River	RR milepost 8.1	Unverified	-120.89409, 45.58908
<a href="#">RM 5.8</a>	Collection	(12) 50'	Use 12 sections of 50' collection boom off of east bank	Gordon Ridge Camp	East bank of river, dirt road from Deschutes State Park approximately 5.4 miles to Sharp's Bar	Downstream habitat	RR milepost 9.8 No-load bearing bridge on east bank. Vehicular access around bridge is available nearby.	Unverified	-120.90580, 45.56545
<a href="#">RM 8.6</a>	Collection	(13) 50'	Use 13 sections of 50' collection boom off of east bank	Bedsprings	East bank of river, dirt road from Deschutes State Park approximately 8.2 miles	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 12.5	Unverified	-120.88342, 45.53280
<a href="#">RM 12.0</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Harris Island back channel	Water tower (east bank)	East bank of river, dirt road from Deschutes State Park approximately 11.4 miles to water tower at Harris Island	East bank back channel, Waterfowl	RR milepost 16.2	Unverified	-120.82646, 45.51643





[Link to specific strategy information](#)

[Link to previous strategy](#)

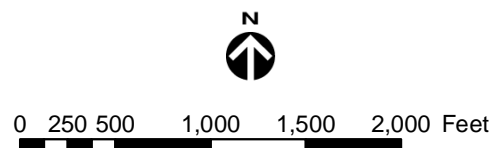
[Link to next strategy](#)

[Link to overview map](#)

## Strategies D-204.5 and 0.4

Proposed Booming and Collection Strategies

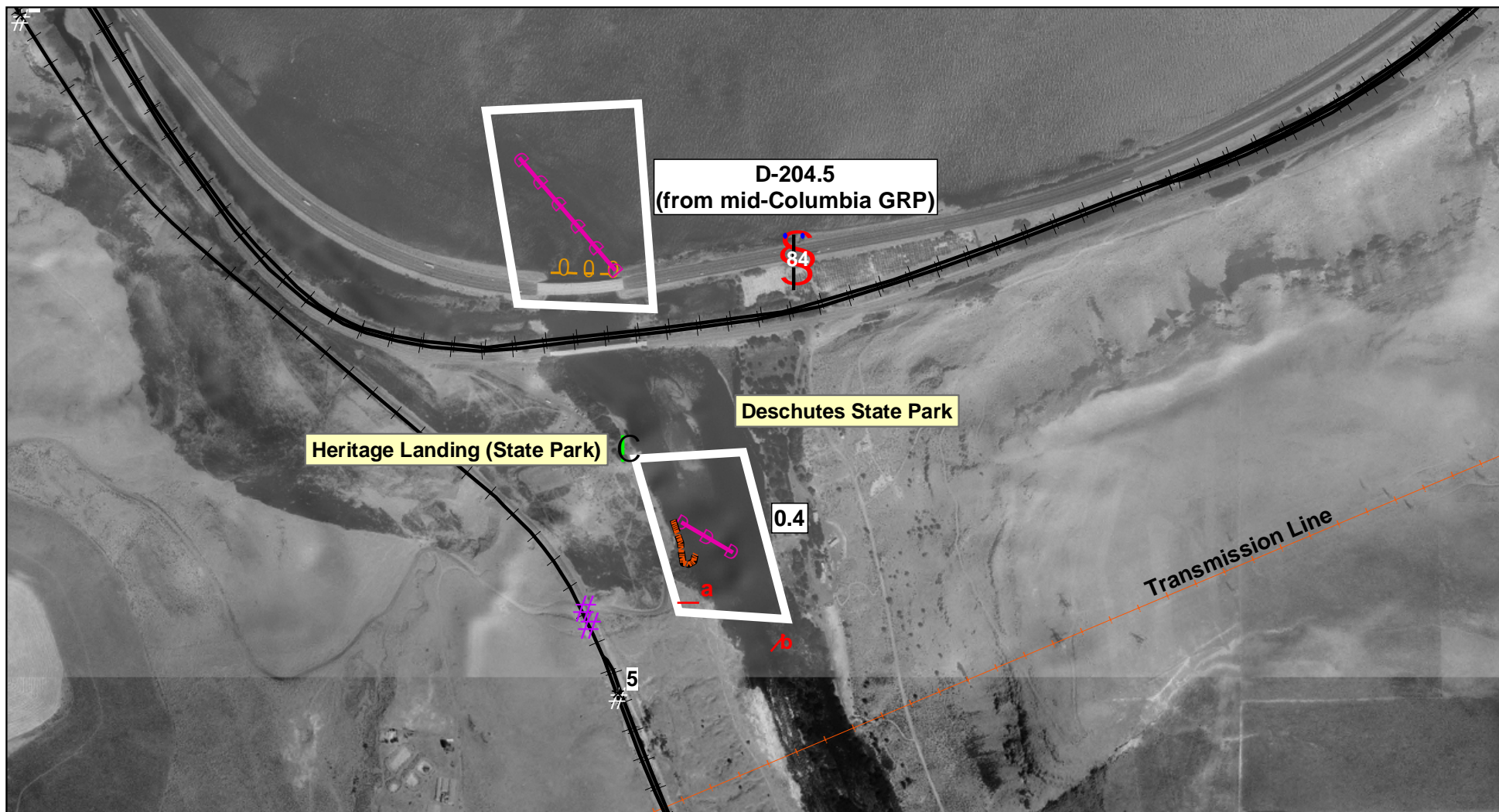
Lower Deschutes River Geographic Response Plan



### Legend

- |                        |  |
|------------------------|--|
| Response strategy area | Boat ramp  |
| Response Objective     | *5 Railroad milepost                             |
| Collection             | Photograph location and direction                |
| Deflection             | # Location where roads cross railroad tracks     |
| Diversion              | 2001 Osprey nest sighting (approximate location) |
|                        | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)

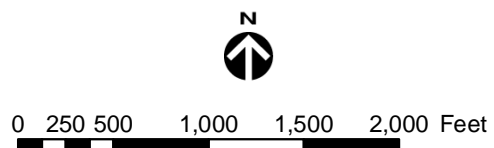
[Link to next strategy](#)

[Link to overview map](#)

## Strategies D-204.5 and 0.4

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-1. Strategies D-204.5 and 0.4 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
D-204.5	Deflection / Diversion	(1) 500' (1) 1,000'	Use either 1,000' deflection to send oil into the main current or 500' exclusion tied to the RR trestle	Heritage Landing Park	I-84 to Exit 88 to Heritage Landing boat ramp	Deschutes River, Waterfowl	RR milepost 4.6 Mid-Columbia GRP response strategy designed to protect the Deschutes River from a spill in the Columbia River.	Unverified	-120.91341, 45.63689
RM 0.4	Collection	(16) 50'	Use 16 sections of 50' collection boom off of west side boat ramp	Heritage Landing Park	I-84 to Heritage Landing Park	Waterfowl, downstream habitat, Columbia River	RR milepost 4.9 (Road to Rail Access) This strategy is the first priority response to an incident on the Deschutes River.	Unverified	-120.90974, 45.63080

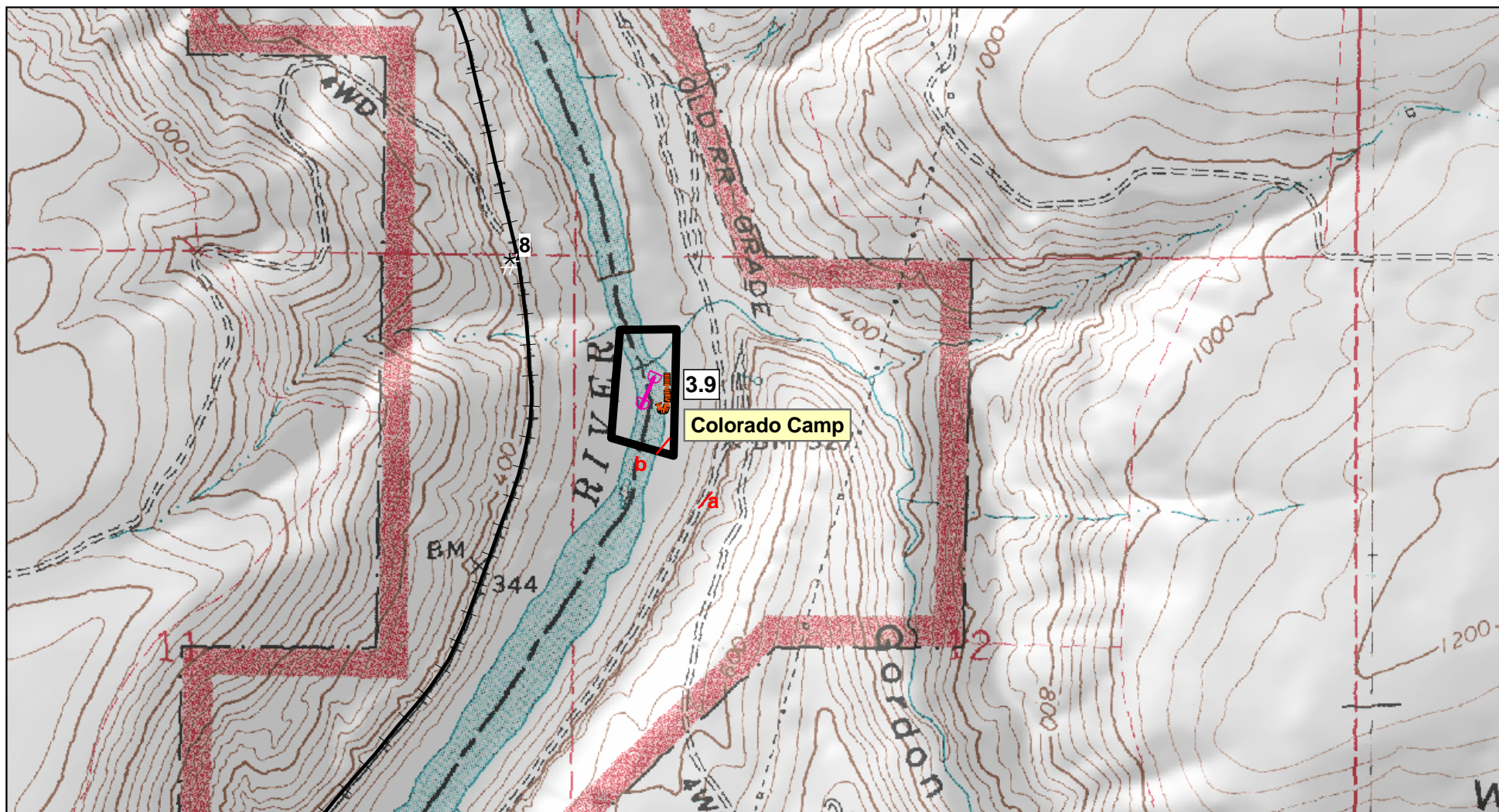


**River Mile 0.4a:** Looking north offshore from Heritage Landing where boom should be placed.



**River Mile 0.4b:** Looking northwest at Heritage Landing. Boom should be placed near trees at middle of photograph.





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 3.9

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
<b>Response Objective</b>			Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 3.9

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

0 250 500 1,000 1,500 2,000 Feet



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-2. Strategy 3.9 – Booming Strategies and Resources Protected**

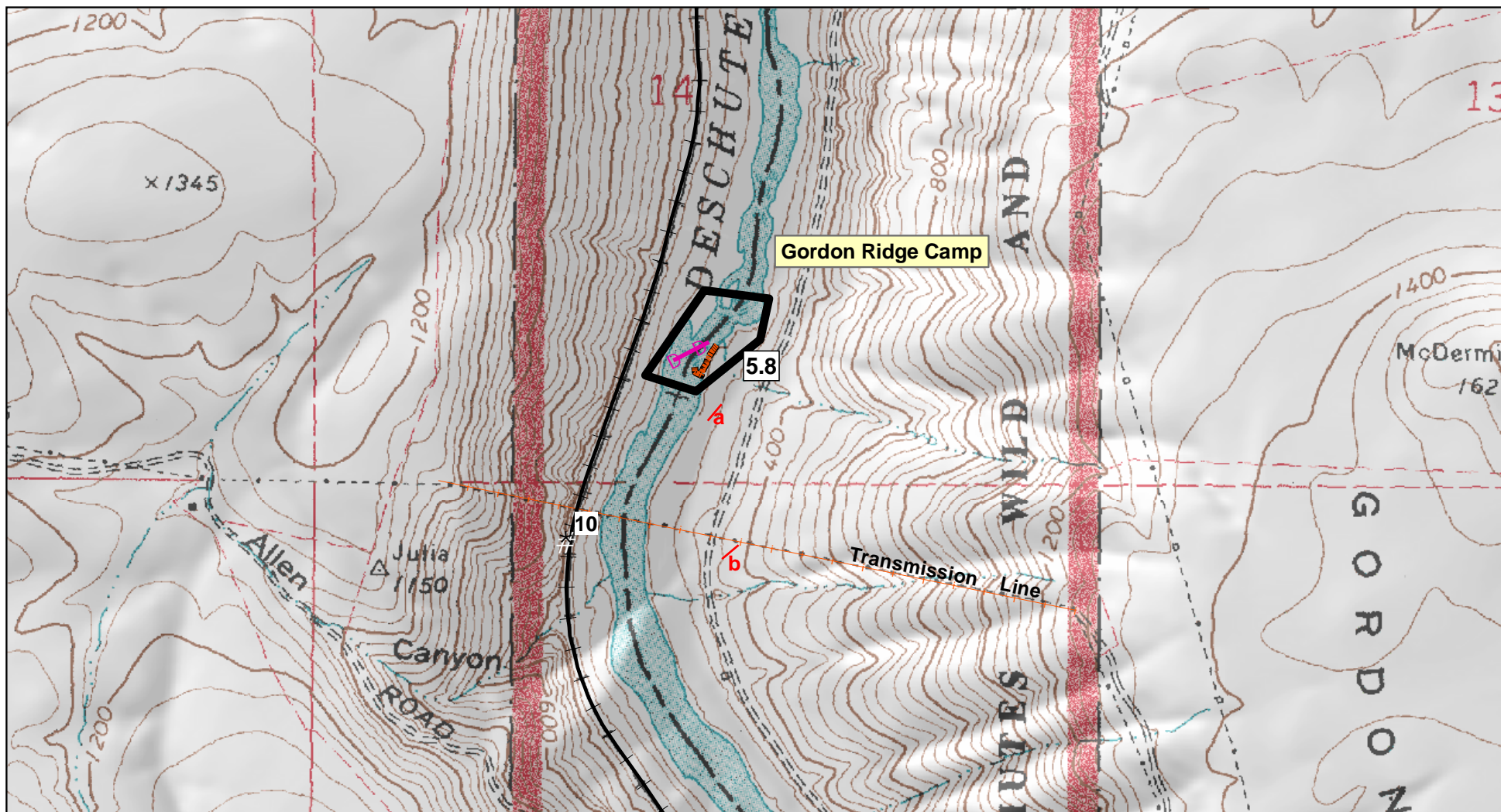
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 3.9</a>	Collection	(12) 50'	Use 12 sections of 50' collection boom off of east bank	Colorado Camp	East bank of river, dirt road from Deschutes State Park approximately 3.6 miles to Colorado Camp	Waterfowl, downstream habitat, irrigation intake, Columbia River	RR milepost 8.1	Unverified	-120.89409, 45.58908



**River Mile 3.9a:** Looking northwest down at Strategy 3.9 from eastside access road.



**River Mile 3.9b:** Looking north from middle of river of location for booming.

[Link to specific strategy information](#)

[Link to previous strategy](#)

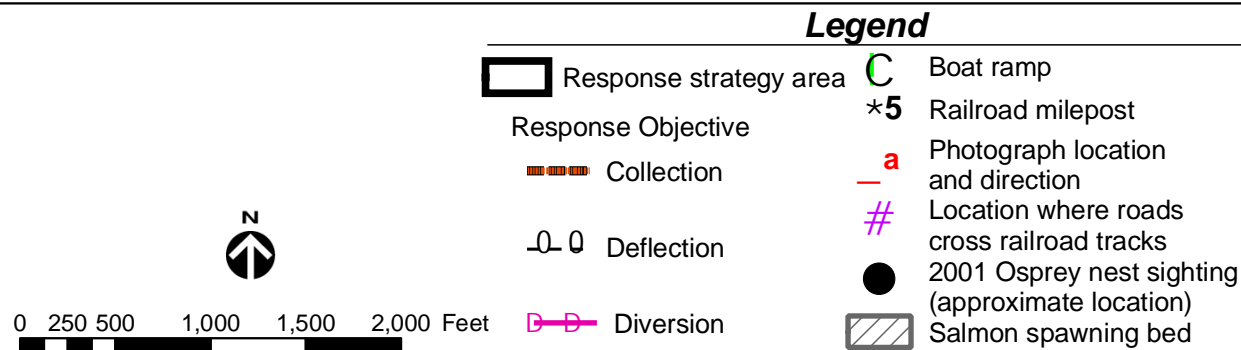
[Link to next strategy](#)

[Link to overview map](#)

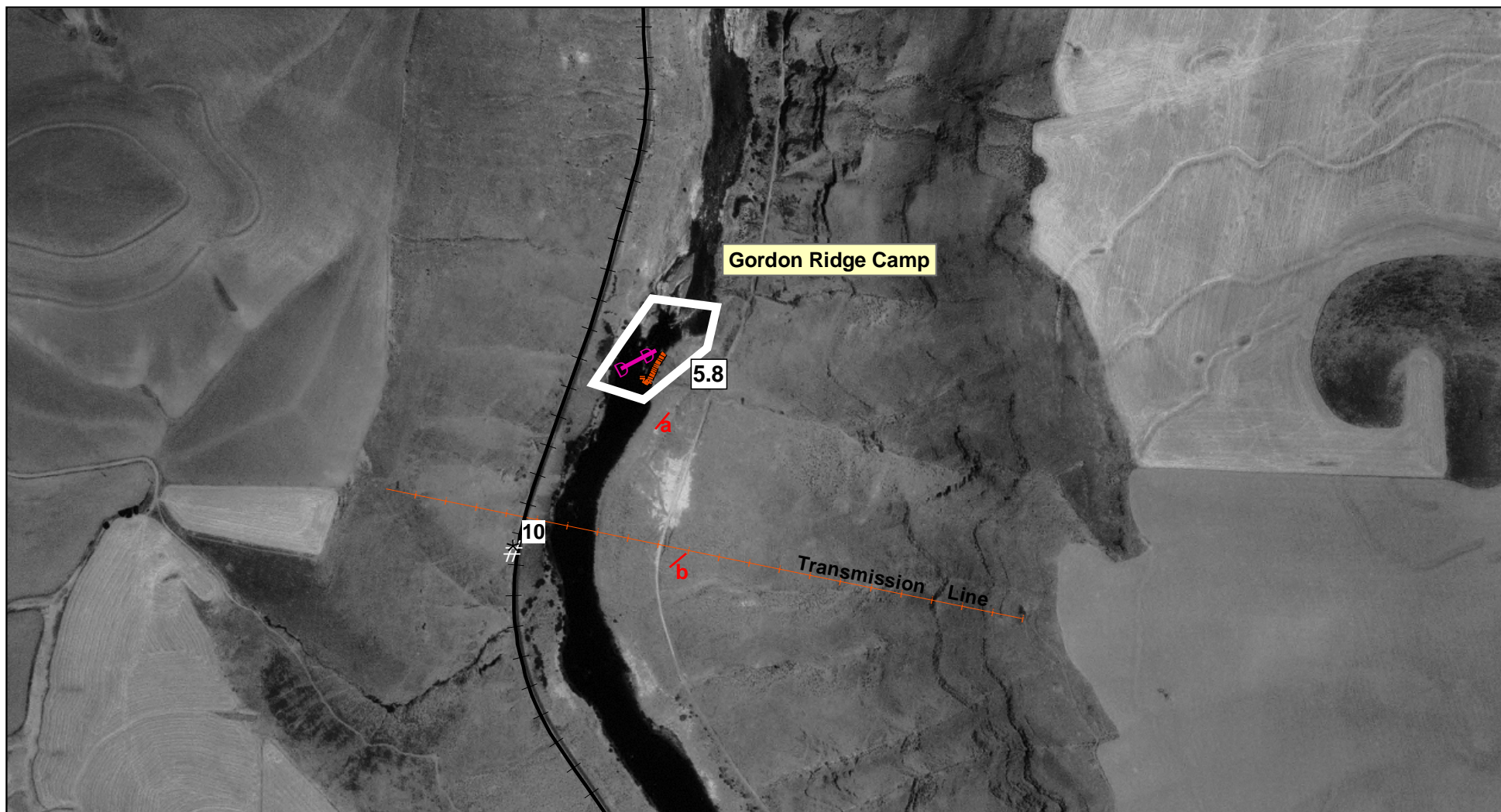
### Strategy 5.8

## Proposed Booming and Collection Strategies

## Lower Deschutes River Geographic Response Plan







[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 5.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-3. Strategy 5.8 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
RM 5.8	Collection	(12) 50'	Use 12 sections of 50' collection boom off of east bank	Gordon Ridge Camp	East bank of river, dirt road from Deschutes State Park approximately 5.4 miles to Sharp's Bar	Downstream habitat	RR milepost 9.8 No-load bearing bridge on east bank. Vehicular access around bridge is available nearby.	Unverified	-120.90580, 45.56545

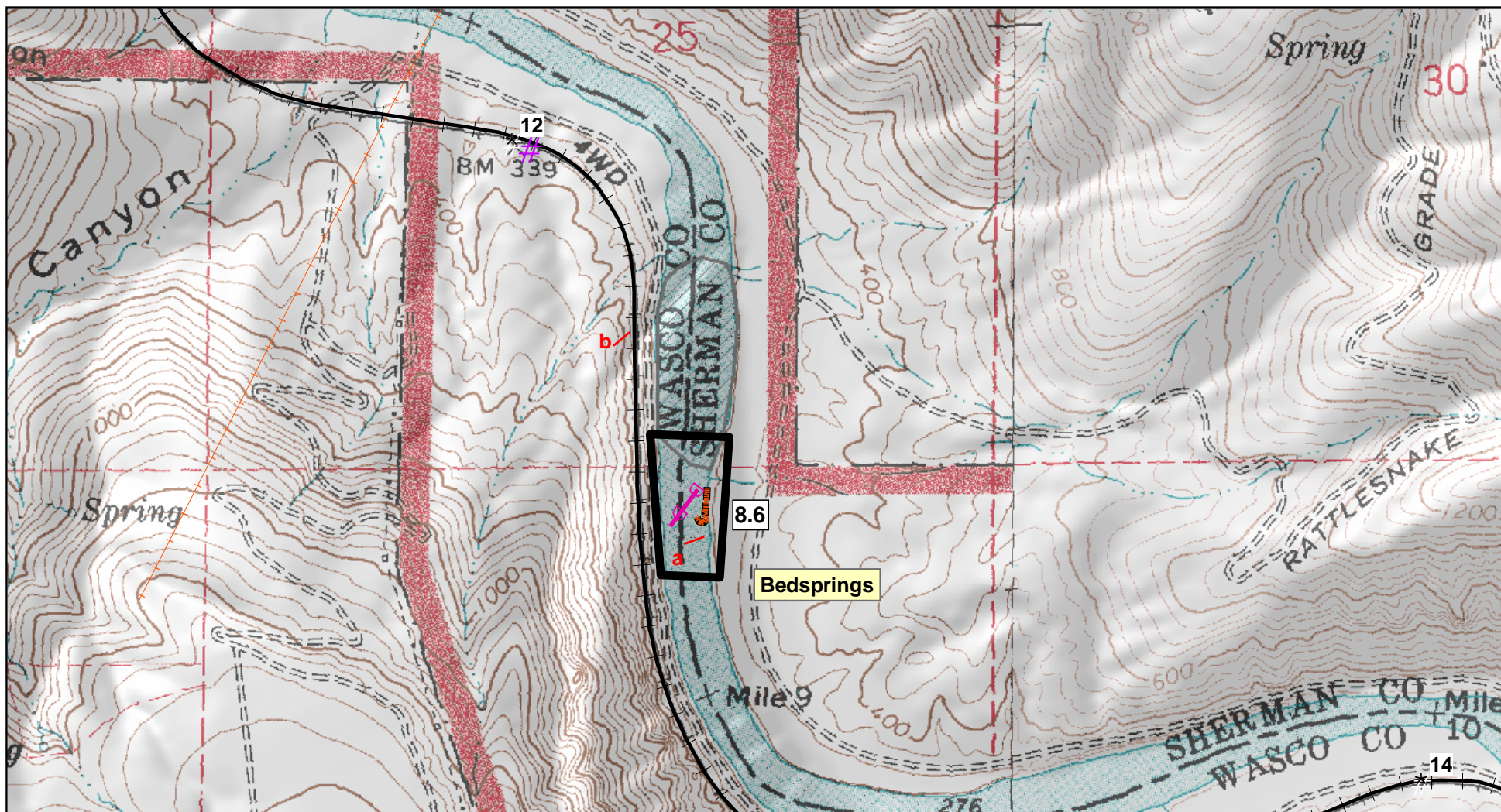


**River Mile 5.8a:** Looking northwest at Strategy 5.8. Boom should be placed here, above rapids.



**River Mile 5.8b:** Looking northwest at Strategy 5.8 above east side access road. Boom should be placed above rapids in middle-right of photo.



[Link to specific strategy information](#)

[Link to previous strategy](#)

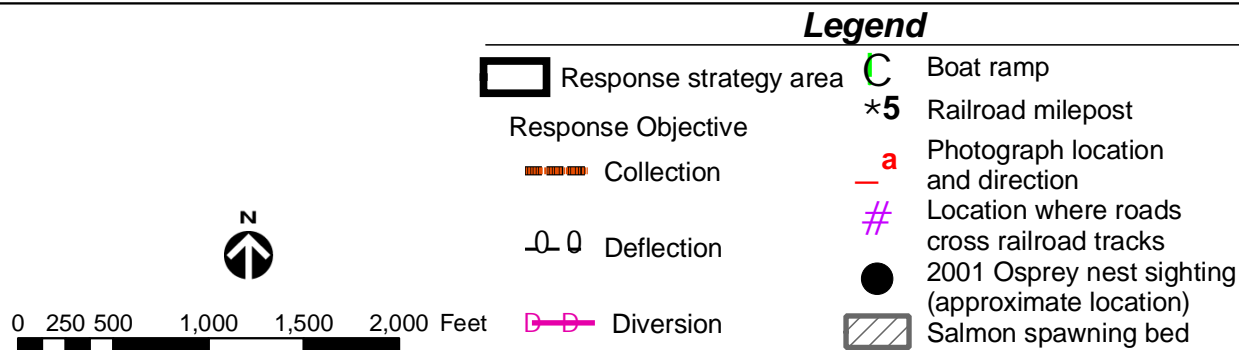
[Link to next strategy](#)

[Link to overview map](#)

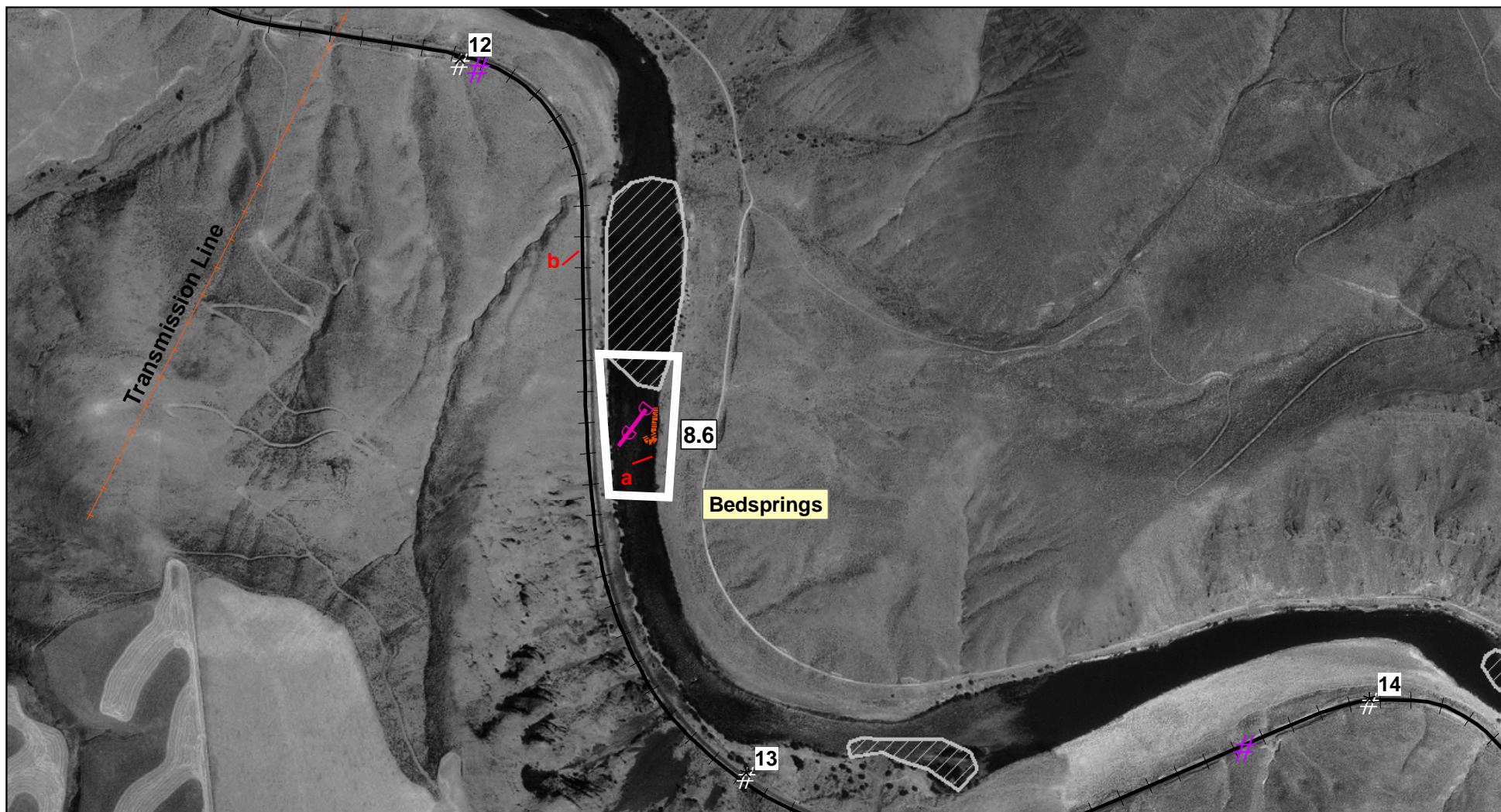
### Strategy 8.6

## Proposed Booming and Collection Strategies

## Lower Deschutes River Geographic Response Plan







[Link to specific strategy information](#)

[Link to previous strategy](#)

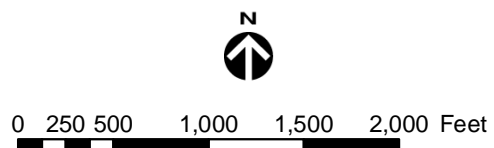
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 8.6

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-4. Strategy 8.6 – Booming Strategies and Resources Protected**

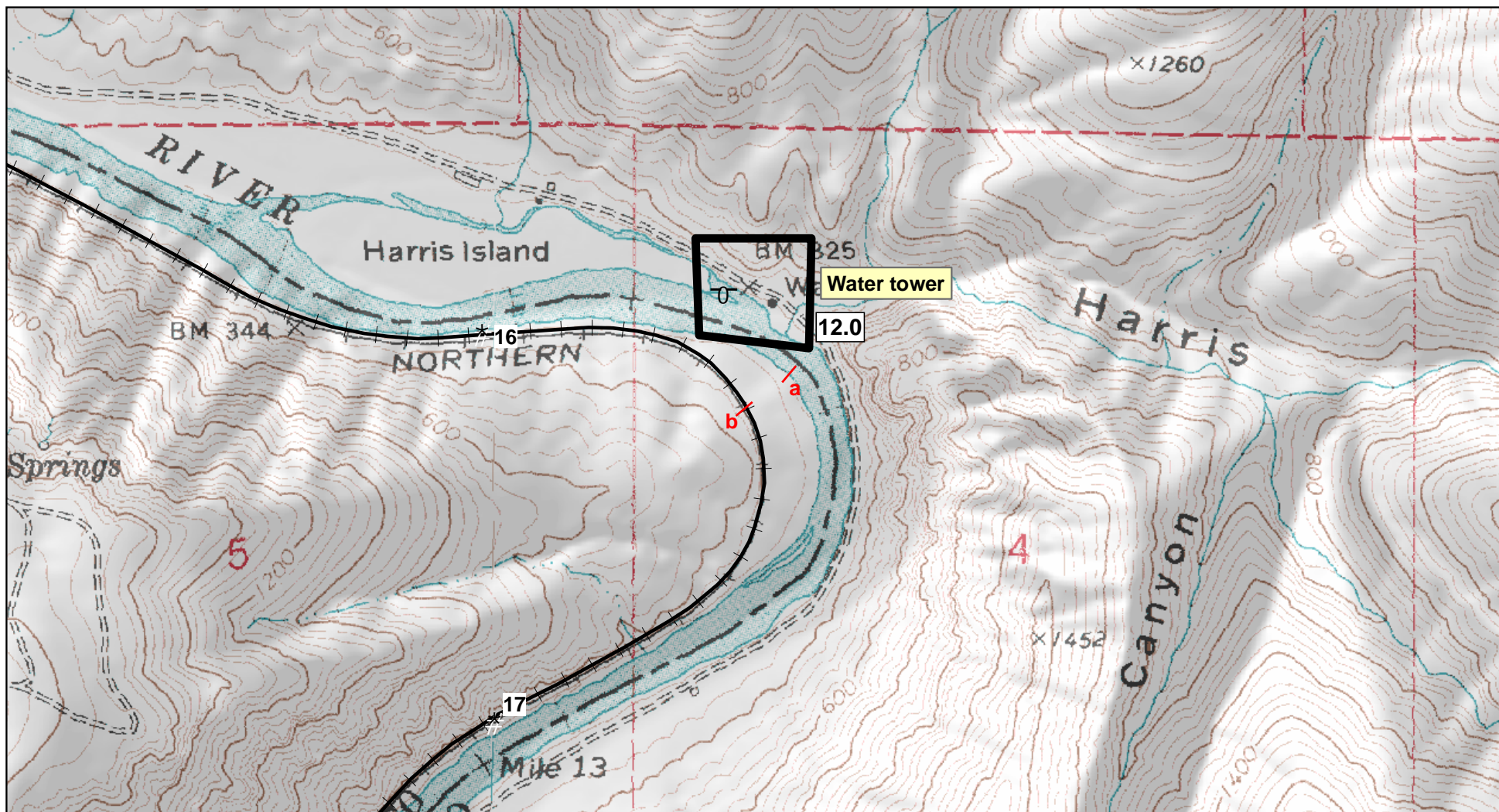
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 8.6</a>	Collection	(13) 50'	Use 13 sections of 50' collection boom off of east bank	Bedsprings	East bank of river, dirt road from Deschutes State Park approximately 8.2 miles	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 12.5	Unverified	-120.88342, 45.53280



**River Mile 8.6a:** Looking south (upstream) from east side riverbank.



**River Mile 8.6b:** Looking southeast from west side railroad tracks at Strategy 8.6.



[Link to specific strategy information](#)

[Link to previous strategy](#)

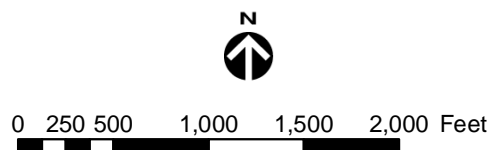
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 12.0

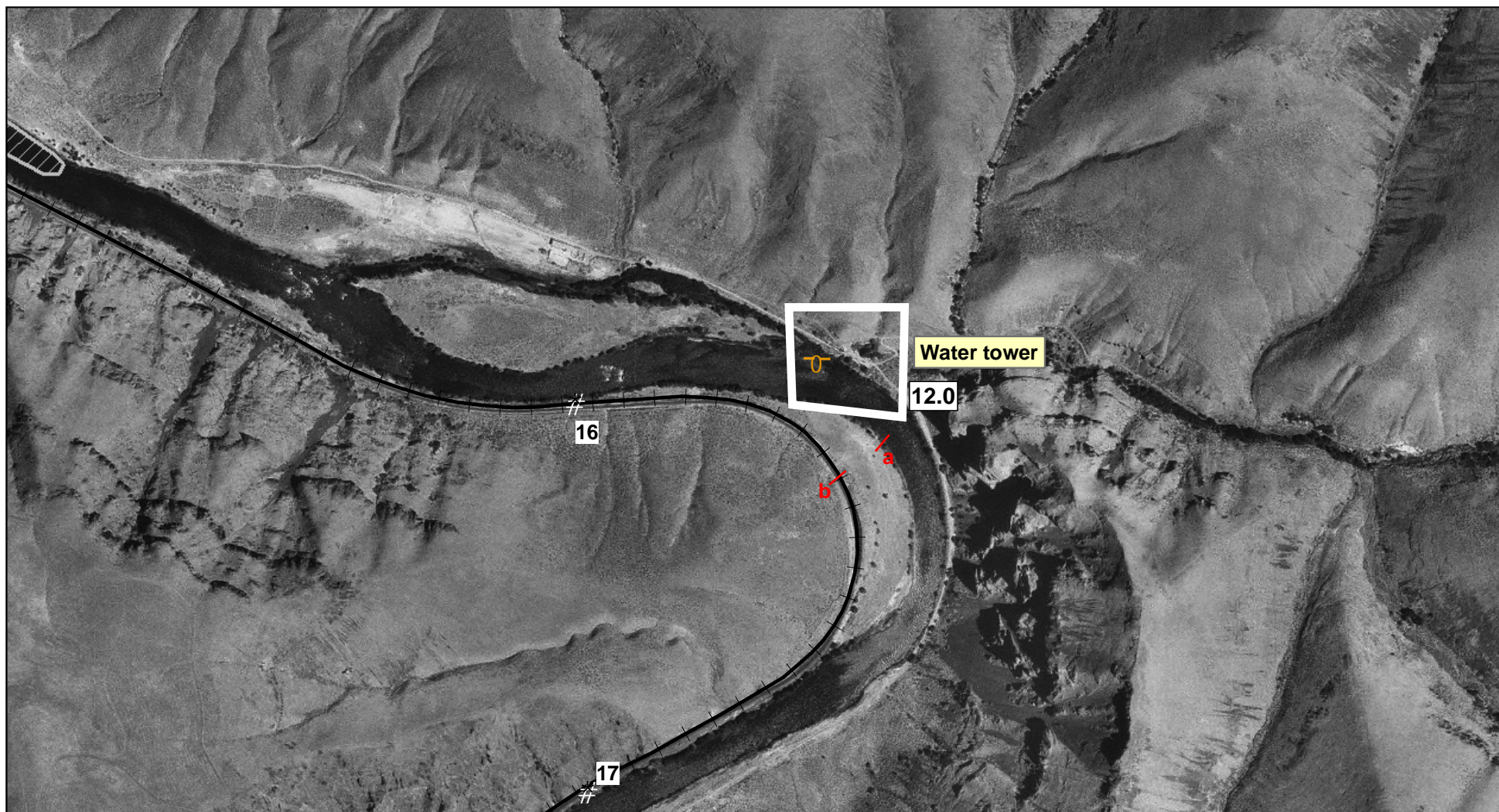
Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



Legend	
	Response strategy area
Response Objective	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 12.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-5. Strategy 12.0 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 12.0</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Harris Island back channel	Water tower (east bank)	East bank of river, dirt road from Deschutes State Park approximately 11.4 miles to water tower at Harris Island	East bank back channel, Waterfowl	RR milepost 16.2	Unverified	-120.82646, 45.51643

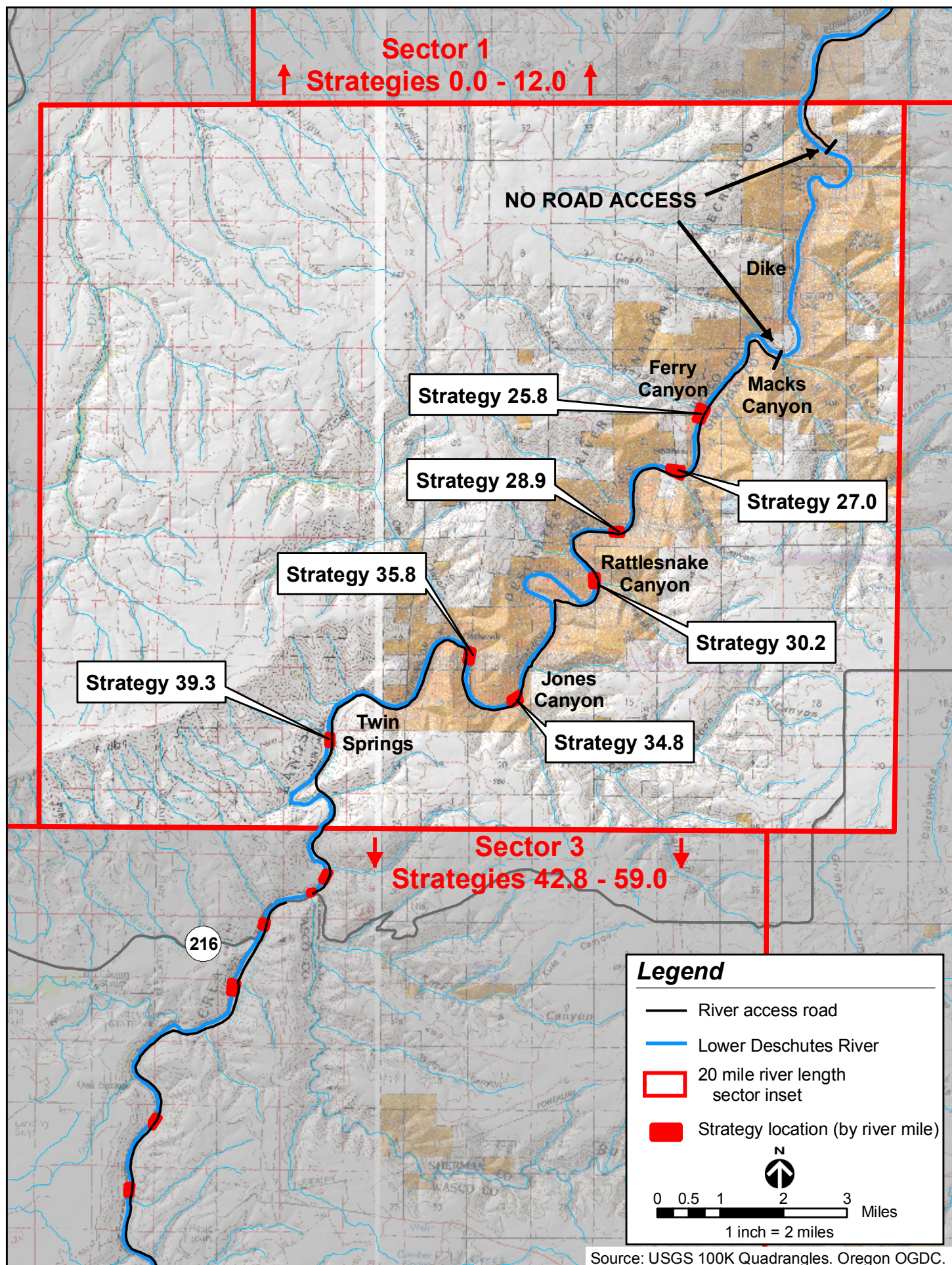


**River Mile 12.0a:** Looking north from west bank at Strategy 12.0. Harris Island is not visible.



**River Mile 12.0b:** Looking northeast from west side railroad tracks. East side access road is visible, but Harris Island is not.



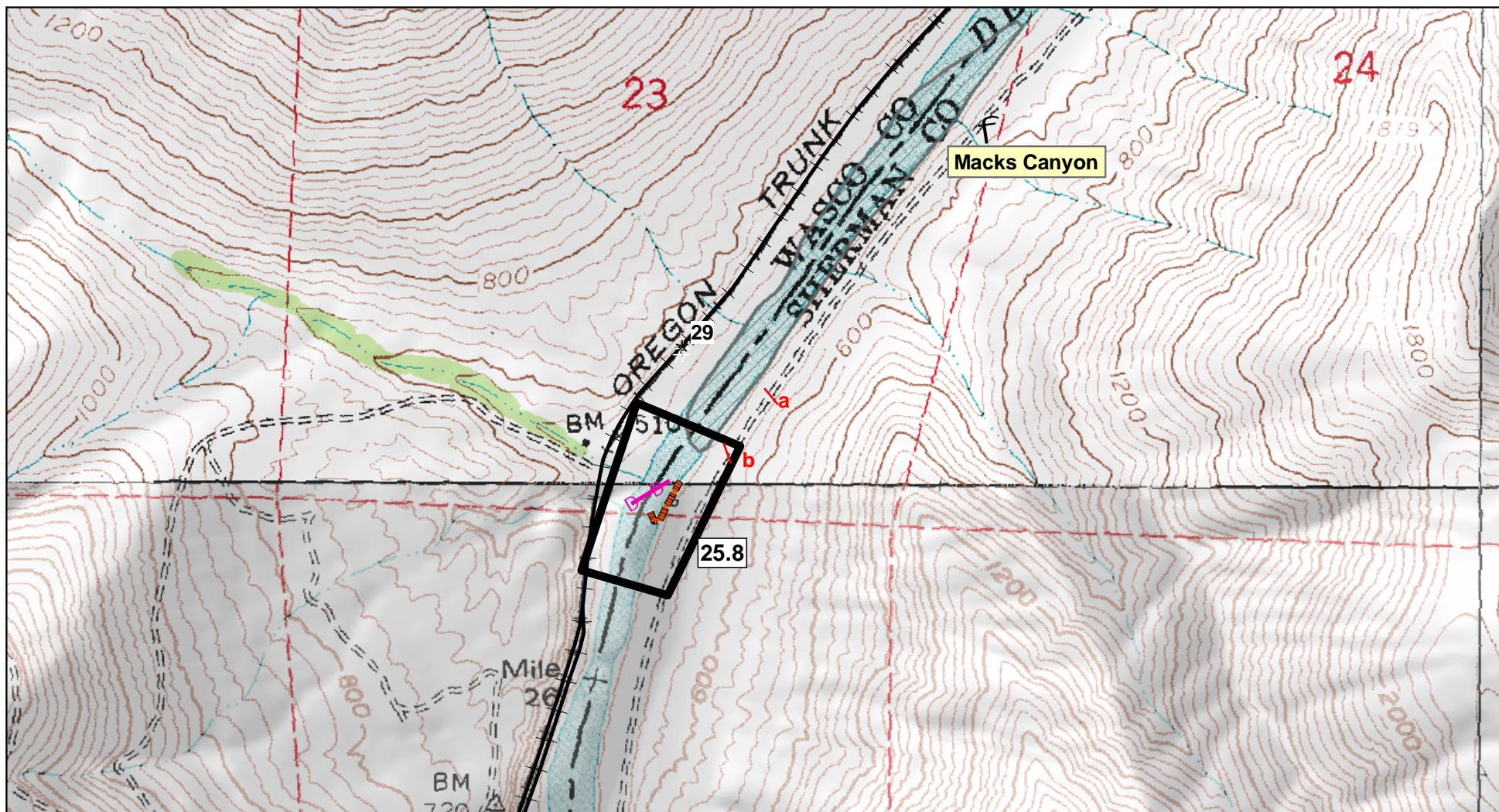


**Figure 4b. Sector 2 (Strategies 25.8 - 39.3) index map of the Lower Deschutes River Geographic Response Plan.**

**Table 4b. Strategies 25.8 to 39.3 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 25.8</a>	Collection	(14) 50'	Use 14 sections of 50' collection boom off of east bank	Macks Canyon	East bank dirt road, approximately 15.3 miles north from Hwy. 216	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 29.2	Unverified	-120.89660, 45.37466
<a href="#">RM 27.0</a>	Collection	(16) 50'	Use 16 sections of 50' collection boom off of east bank	Macks Canyon	East bank dirt road, approximately 14.1 miles north from Hwy. 216	Downstream habitat	RR milepost 30.3	Unverified	-120.90480, 45.36138
<a href="#">RM 28.9</a>	Collection	(12) 50'	Use 12 sections of 50' collection boom off of east bank	Private land, east bank	East bank dirt road, approximately 12.4 miles north from Hwy. 216	Downstream habitat	RR milepost 32.1	Unverified	-120.92384, 45.34737
<a href="#">RM 30.2</a>	Collection	(10) 50'	Use 10 sections of 50' collection boom off of east bank	Rattlesnake Canyon	East bank dirt road, approximately 10.8 miles north from Hwy. 216	Downstream habitat	RR milepost 33.8	Unverified	-120.93110, 45.33618
<a href="#">RM 34.8</a>	Collection	(11) 50'	Use 11 sections of 50' collection boom off of east bank	Jones Canyon Camp	East bank dirt road, approximately 8.0 miles north from Hwy. 216	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 37.8	Unverified	-120.95662, 45.30875
<a href="#">RM 35.8</a>	Collection	(11) 50'	Use 11 sections of 50' collection boom off of east bank	Oakbrook	East bank dirt road, approximately 6.5 miles north from Hwy. 216	Downstream habitat	RR milepost 39.2	Unverified	-120.97169, 45.31873
<a href="#">RM 39.3</a>	Collection	(11) 50'	Use 11 sections of 50' collection boom off of east bank	Pine Tree	East bank dirt road, approximately 3.0 miles north from Hwy. 216	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 43.0	Unverified	-121.01695, 45.29920





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 25.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



0 250 500 1,000 1,500 2,000 Feet

### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)

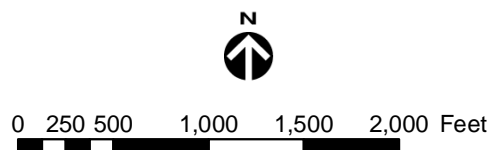
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 25.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-6. Strategy 25.8 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 25.8</a>	Collection	(14) 50'	Use 14 sections of 50' collection boom off of east bank	Macks Canyon	East bank dirt road, approximately 15.3 miles north from Hwy. 216	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 29.2	Unverified	-120.89660, 45.37466



**River Mile 25.8a:** Looking southwest from east side access road at Strategy 25.8. Note parking lot on east side of river.

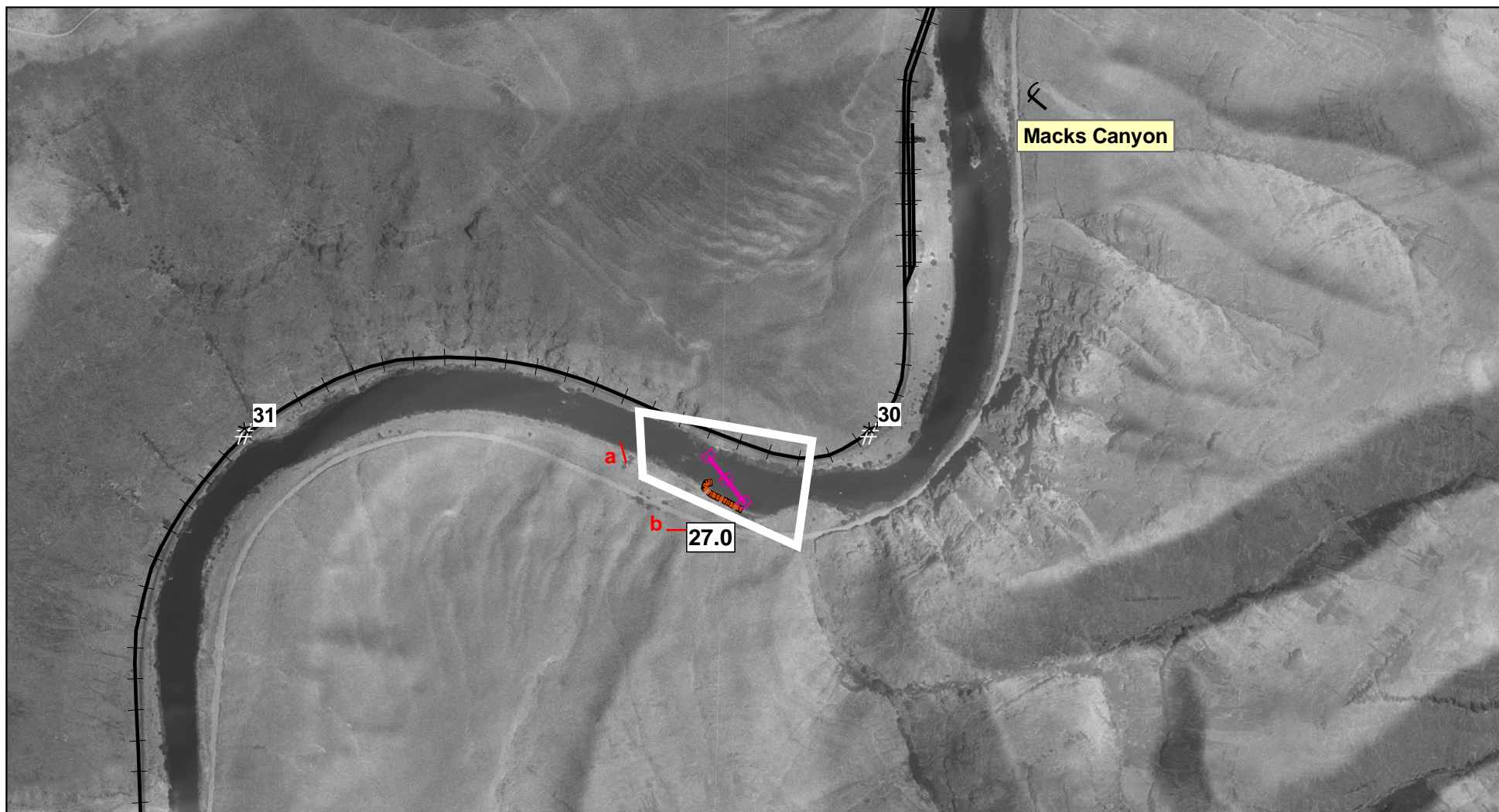


**River Mile 25.8b:** Looking southwest from east side of river at Strategy 25.8.









[Link to specific strategy information](#)

[Link to previous strategy](#)

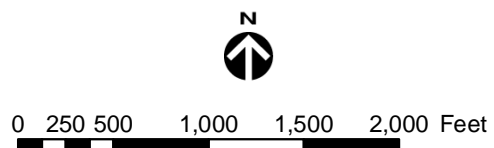
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 27.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-7. Strategy 27.0 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 27.0</a>	Collection	(16) 50'	Use 16 sections of 50' collection boom off of east bank	Macks Canyon	East bank dirt road, approximately 14.1 miles north from Hwy. 216	Downstream habitat	RR milepost 30.3	Unverified	-120.90480, 45.36138

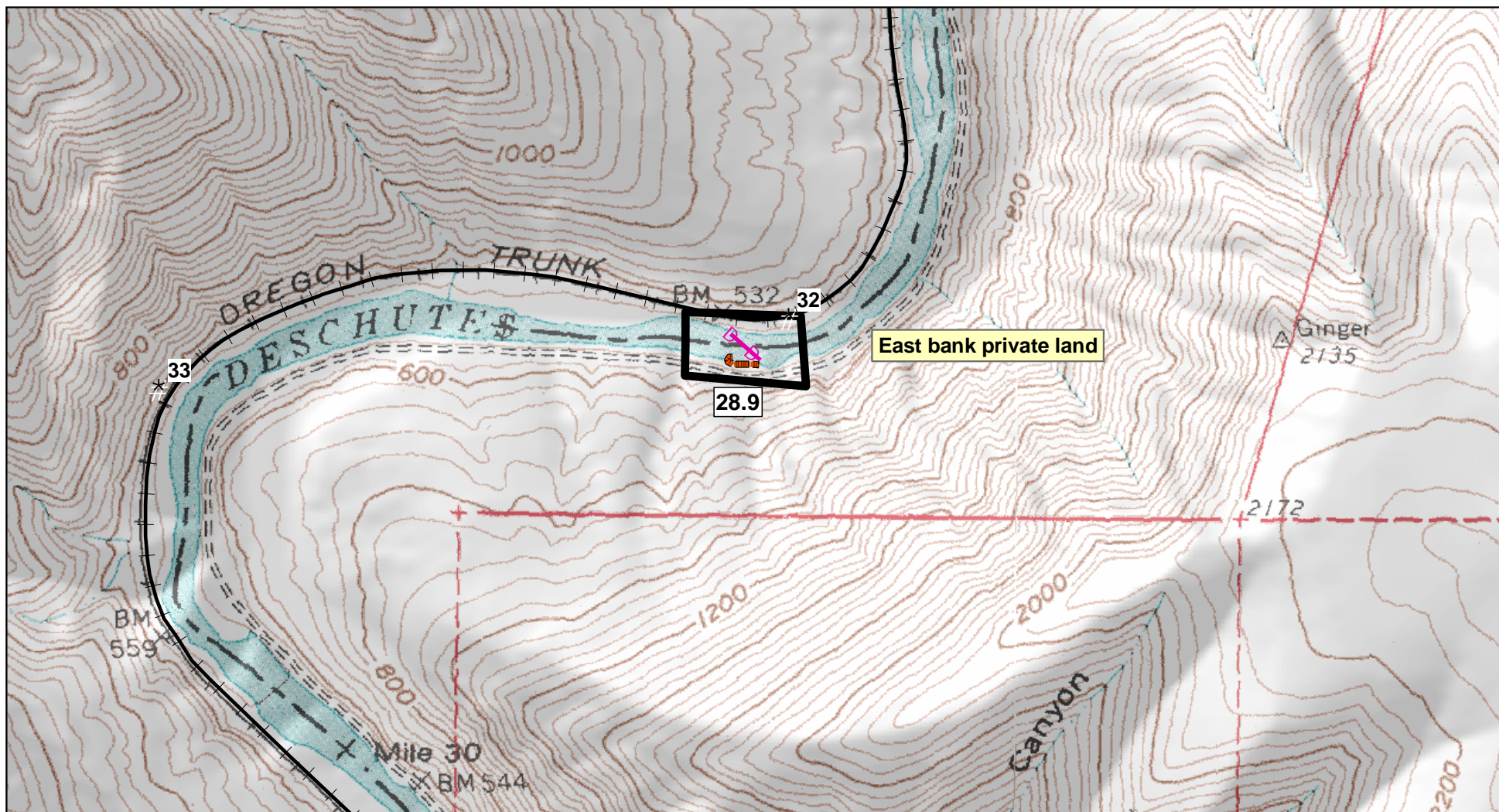


**River Mile 27.0a:** Looking east at rapids below Strategy 27.0.



**River Mile 27.0b:** Looking north at rapids below Strategy 27.0. Note railcar.





[Link to specific strategy information](#)

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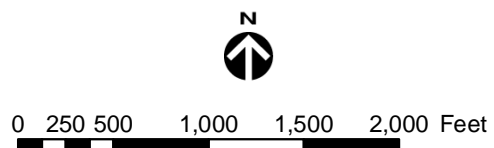
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 28.9

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)












[Link to overview map](#)

## Strategy 28.9

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

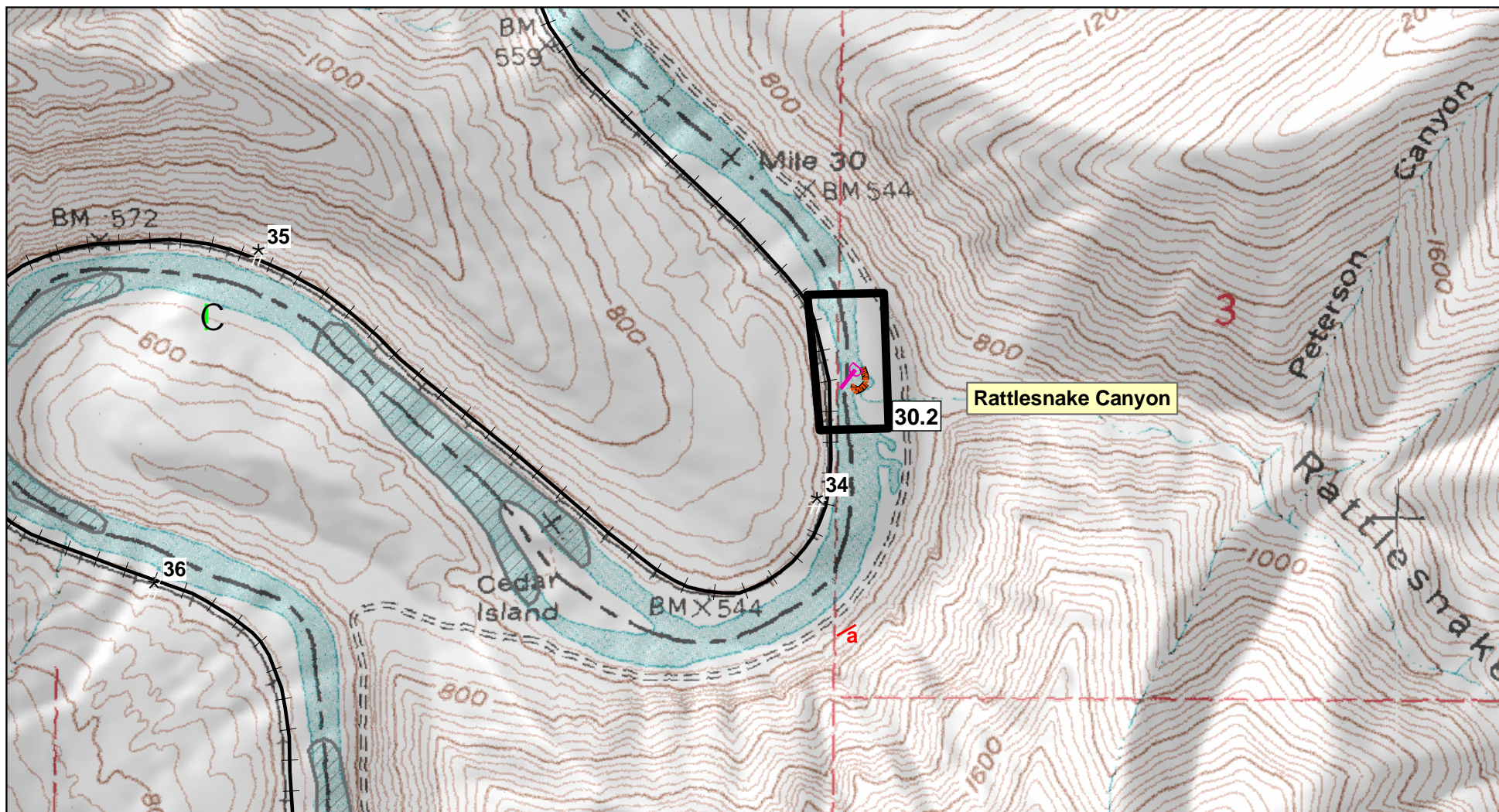


**Table 4-8. Strategy 28.9 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 28.9</a>	Collection	(12) 50'	Use 12 sections of 50' collection boom off of east bank	Private land, east bank	East bank dirt road, approximately 12.4 miles north from Hwy. 216	Downstream habitat	RR milepost 32.1	Unverified	-120.92384, 45.34737

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[Link to specific strategy information](#)

[Link to previous strategy](#)

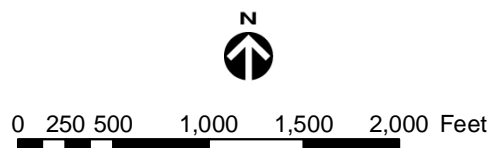
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 30.2

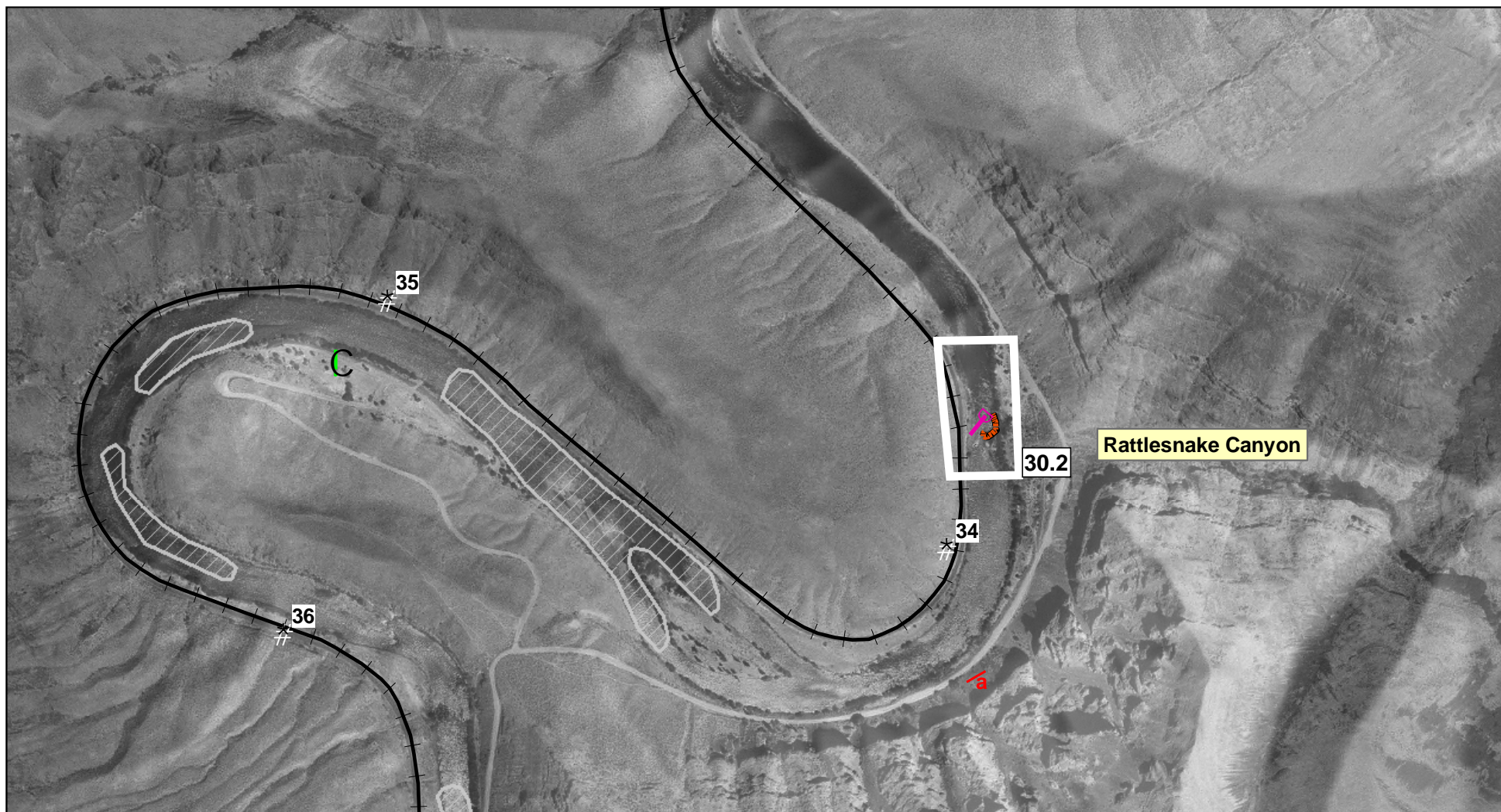
Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



Legend	
	Response strategy area
Response Objective	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed





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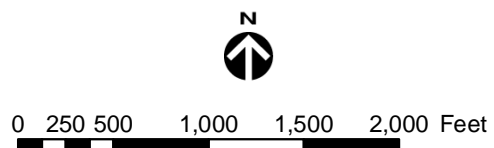
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 30.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-9. Strategy 30.2 – Booming Strategies and Resources Protected**

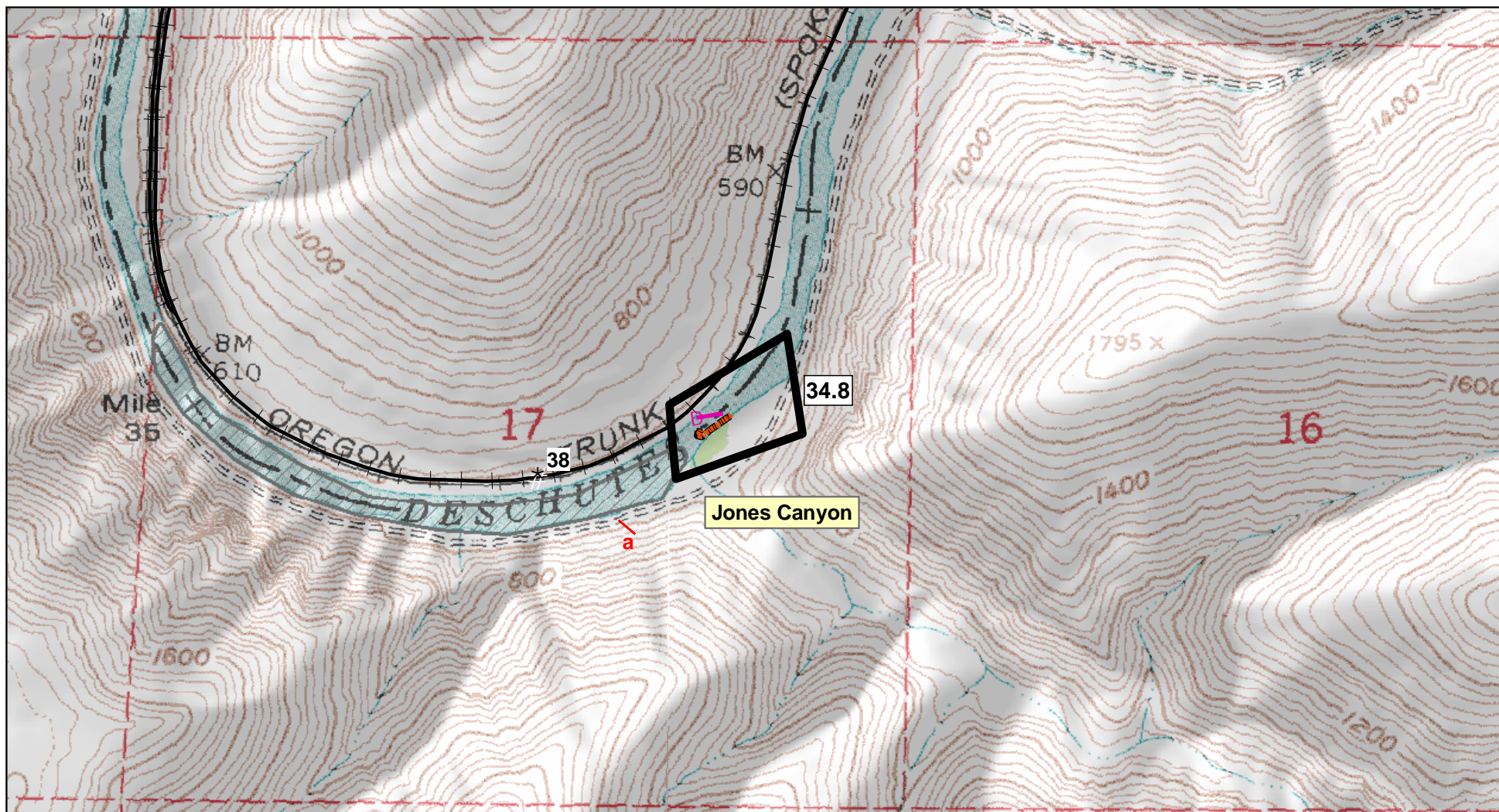
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 30.2</a>	Collection	(10) 50'	Use 10 sections of 50' collection boom off of east bank	Rattlesnake Canyon	East bank dirt road, approximately 10.8 miles north from Hwy. 216	Downstream habitat	RR milepost 33.8	Unverified	-120.93110, 45.33618



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**River Mile 30.2a:** Looking north from east side bank. Strategy 30.2 is around corner, downstream.





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## Strategy 34.8

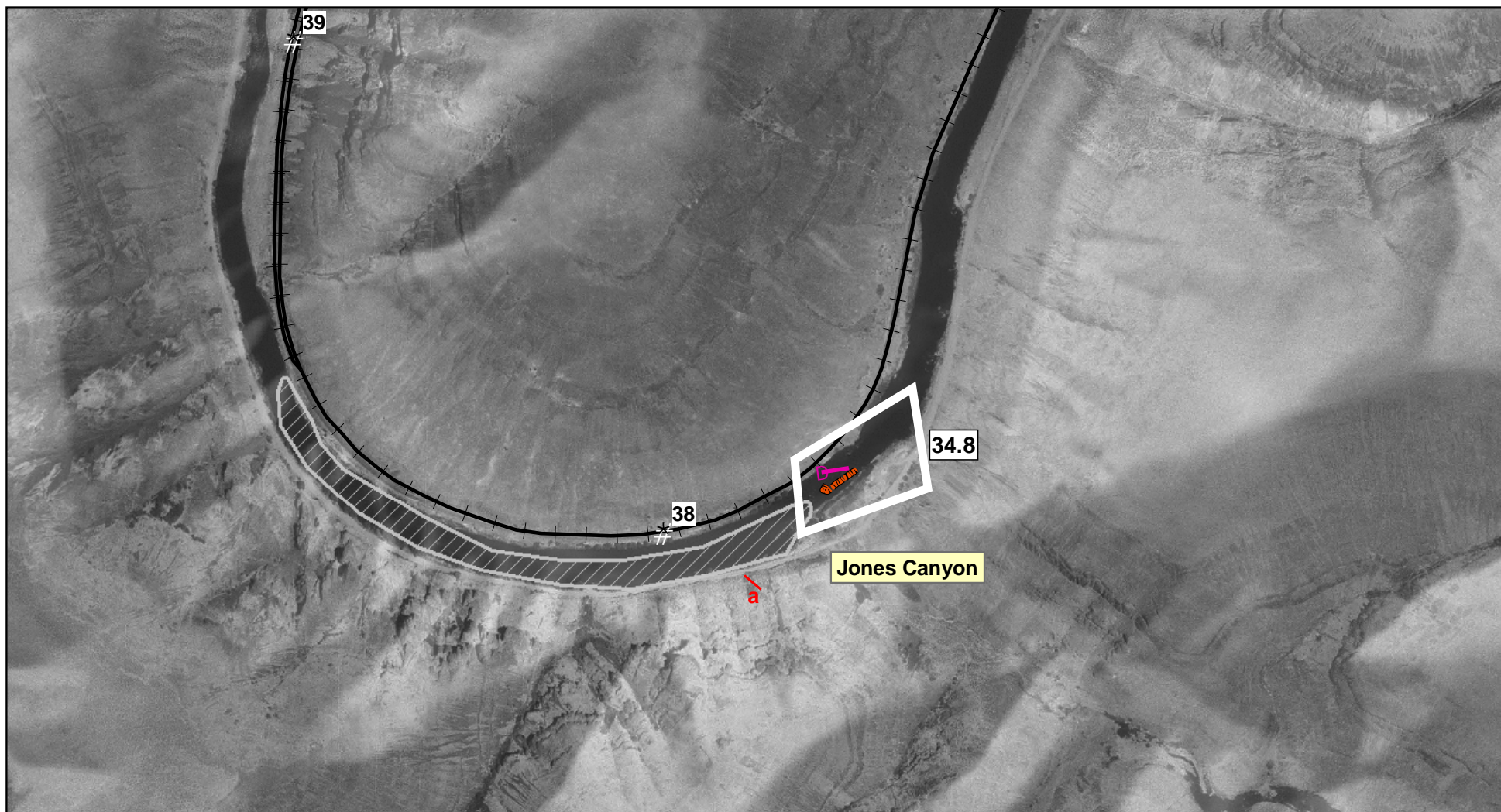
Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





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## Strategy 34.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-10. Strategy 34.8 – Booming Strategies and Resources Protected**

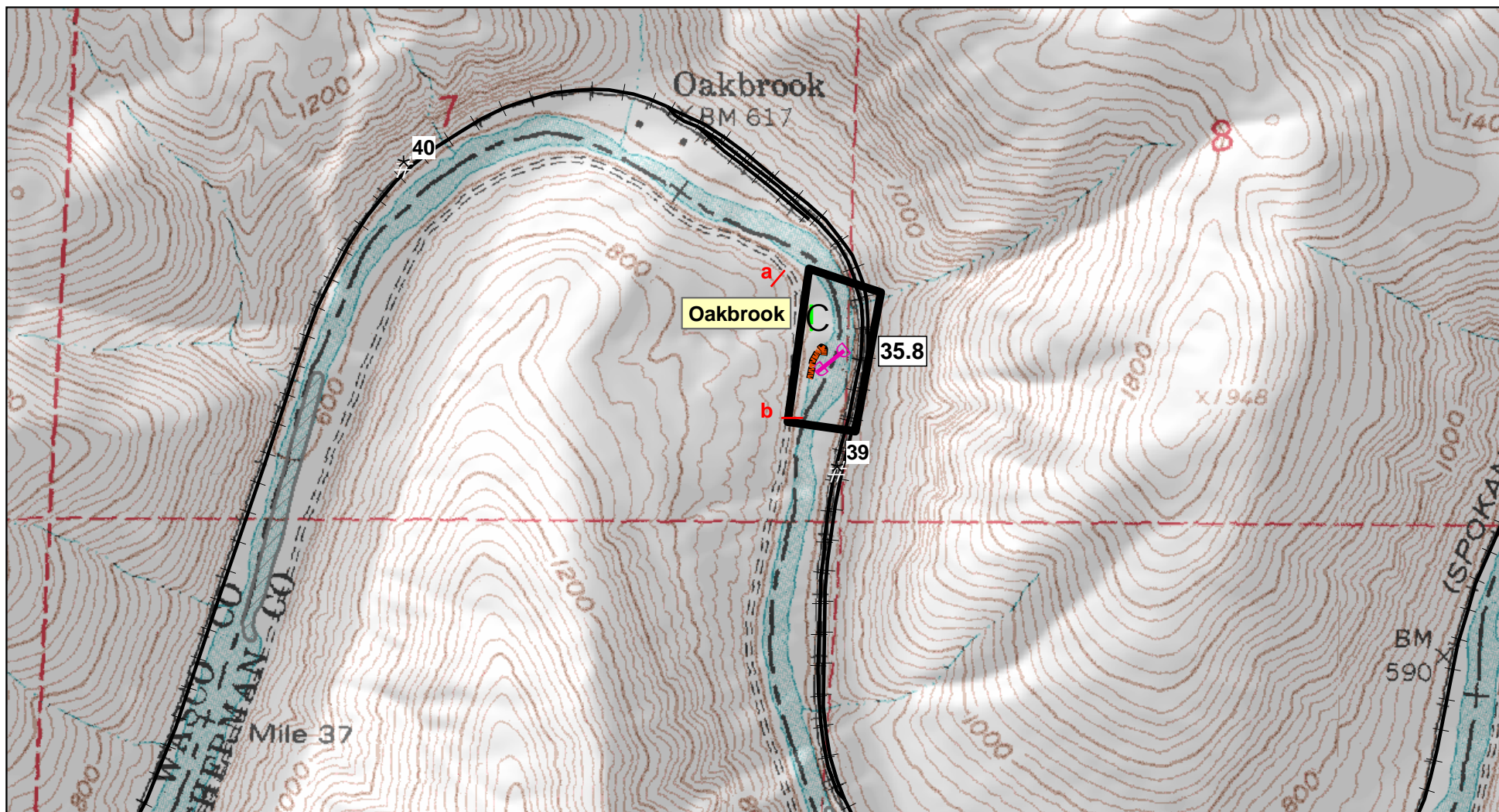
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 34.8</a>	Collection	(11) 50'	Use 11 sections of 50' collection boom off of east bank	Jones Canyon Camp	East bank dirt road, approximately 8.0 miles north from Hwy. 216	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 37.8	Unverified	-120.95662, 45.30875



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**River Mile 34.8a:** Looking north from east side bank. Strategy 34.8 is at bottom of rapids offshore from Jones Canyon.





[Link to specific strategy information](#)

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[Link to overview map](#)

## Strategy 35.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



0 250 500 1,000 1,500 2,000 Feet

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



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[Link to previous strategy](#)

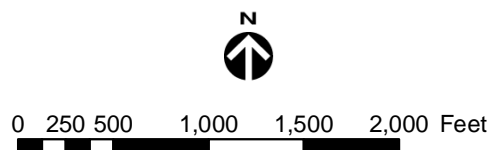
[Link to next strategy](#)

[Link to overview map](#)

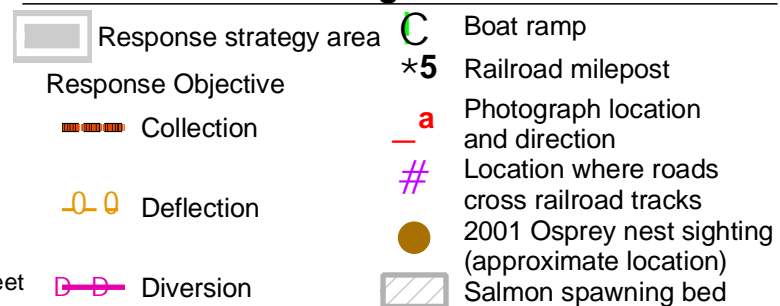
### Strategy 35.8

## Proposed Booming and Collection Strategies

## Lower Deschutes River Geographic Response Plan



### Legend





**Table 4-11. Strategy 35.8 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 35.8</a>	Collection	(11) 50'	Use 11 sections of 50' collection boom off of east bank	Oakbrook	East bank dirt road, approximately 6.5 miles north from Hwy. 216	Downstream habitat	RR milepost 39.2	Unverified	-120.97169, 45.31873

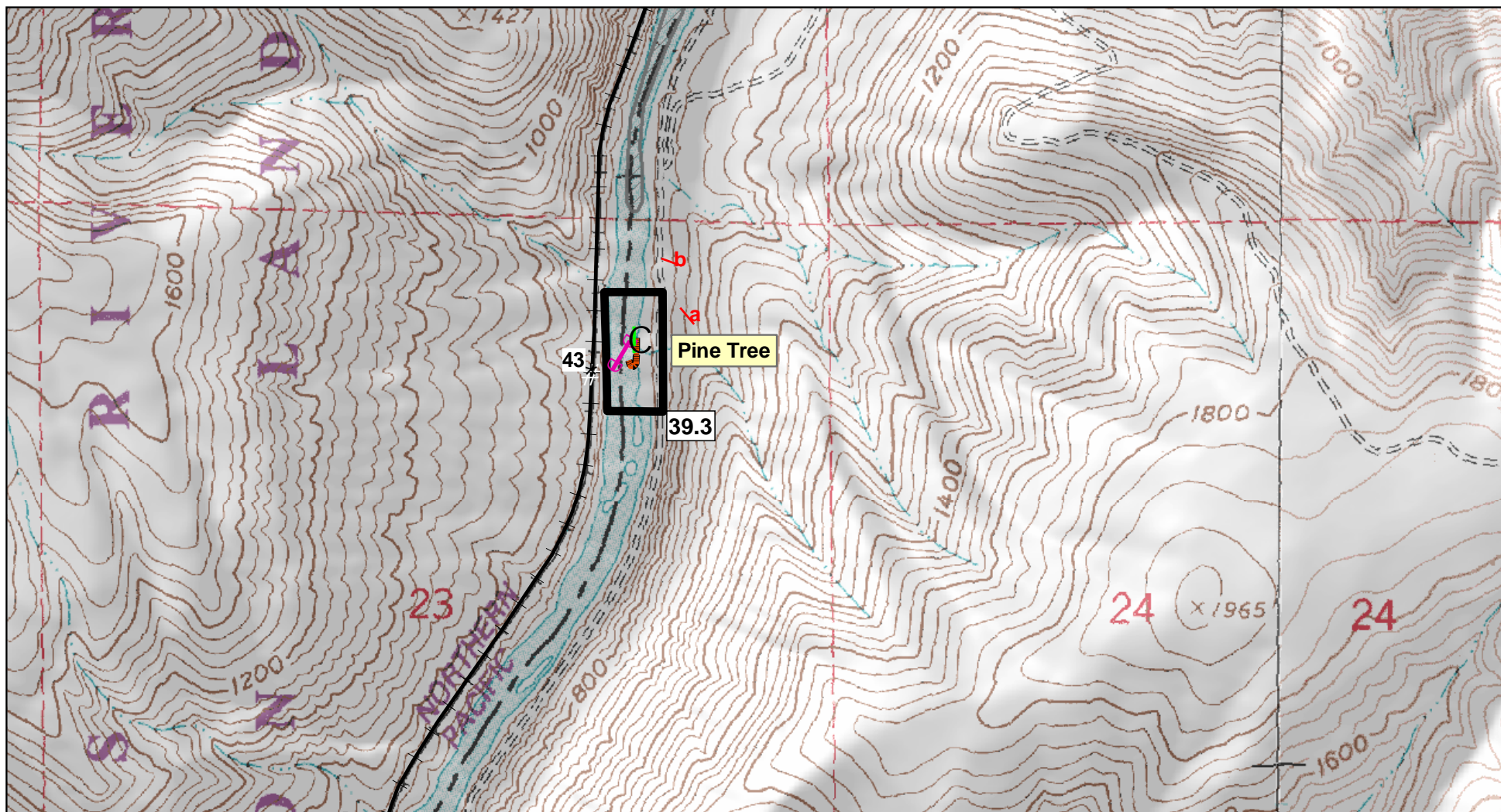


**River Mile 35.8a:** Looking east from south bank. Strategy 35.8 is at the eddy shown.



**River Mile 35.8b:** Looking west from access road. Eddy at Strategy 35.8 can be seen in middle of photograph.





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[Link to overview map](#)

## Strategy 39.3

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



0 250 500 1,000 1,500 2,000 Feet

### Legend

	Response strategy area		Boat ramp
<b>Response Objective</b>			Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed





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[Link to previous strategy](#)

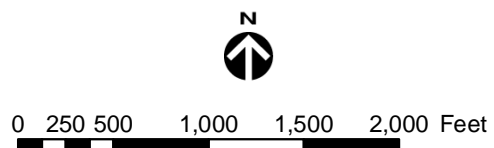
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 39.3

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-12. Strategy 39.3 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 39.3</a>	Collection	(11) 50'	Use 11 sections of 50' collection boom off of east bank	Pine Tree	East bank dirt road, approximately 3.0 miles north from Hwy. 216	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 43.0	Unverified	-121.01695, 45.29920

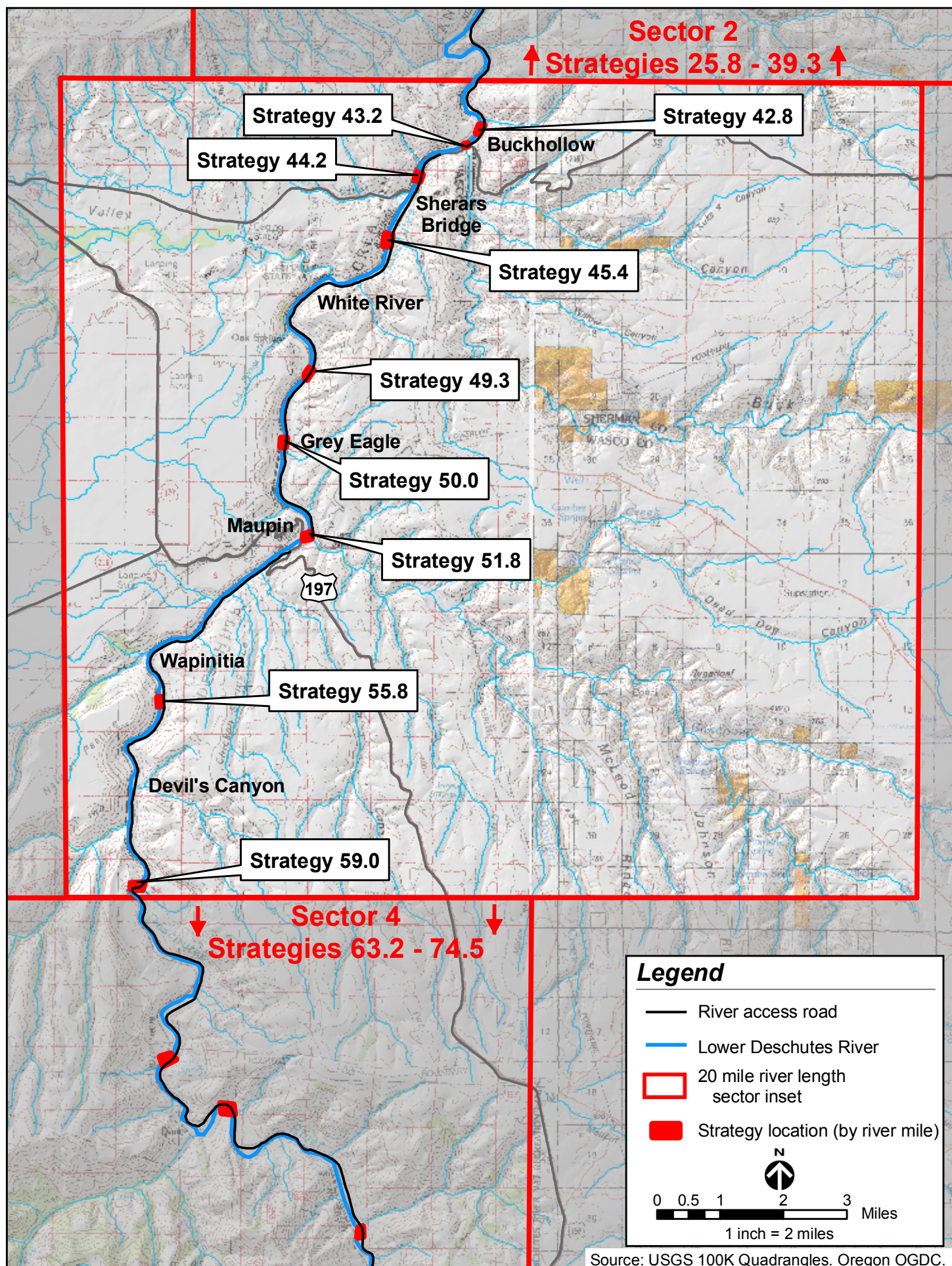


**River Mile 39.3a:** Looking southwest at Strategy 39.3. Note river access at left of photograph.



**River Mile 39.3b:** Looking southwest at Strategy 39.3. River access is at middle of photograph.



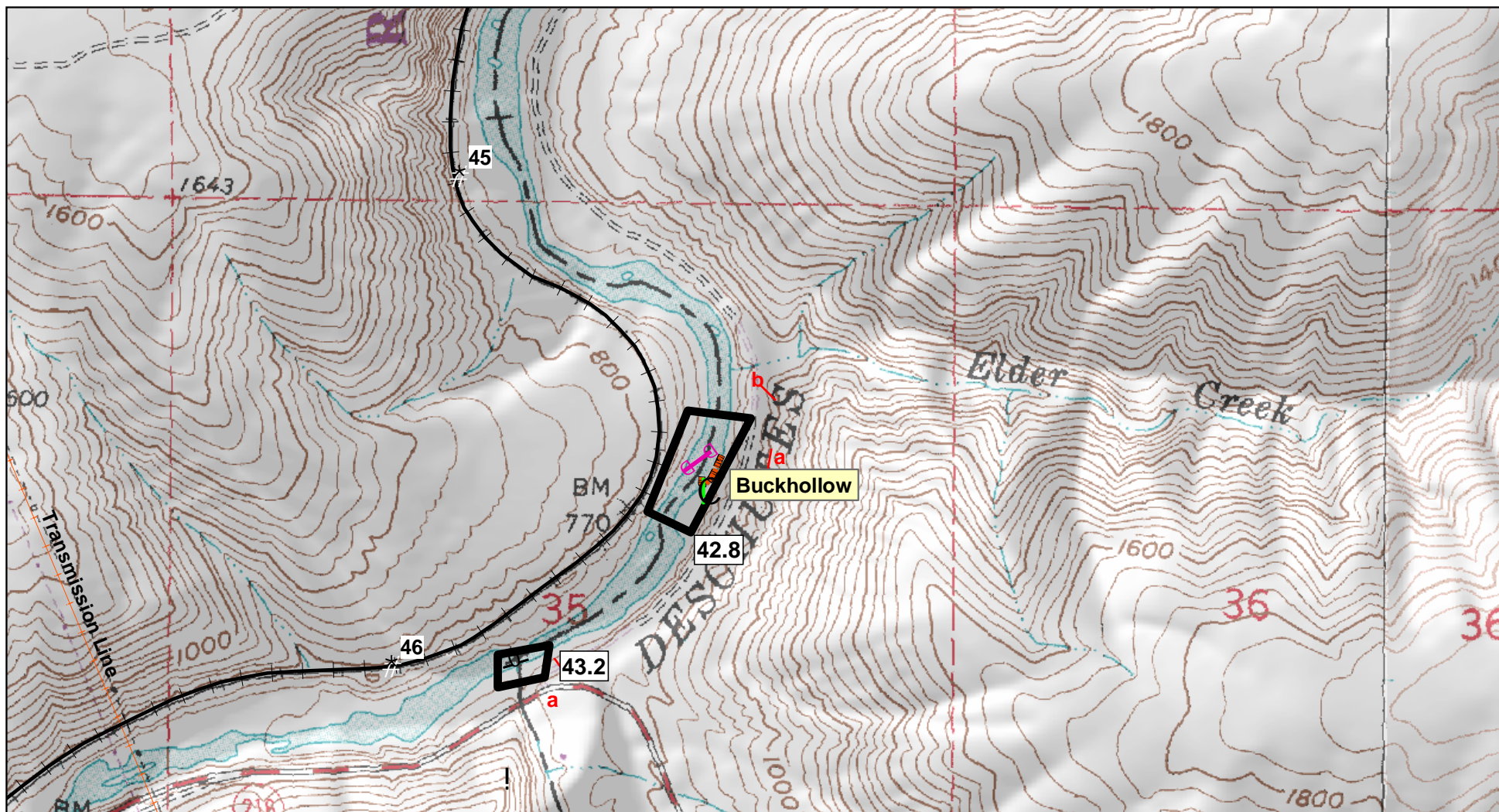


**Figure 4c. Sector 3 (Strategies 42.8 - 59.0) index map of the Lower Deschutes River Geographic Response Plan.**

Table 4c. Strategies 42.8 through 59.0 – Booming Strategies and Resources Protected

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 42.8</a>	Collection	(8) 50'	Use 5 sections (50') of short skirt boom to deflect oil to east side; use 3 sections (50') of short skirt boom to collect oil at shore	Buck Hollow	East bank of river, dirt road approximately 0.4 miles north from Hwy. 216 to Buck Hollow	Downstream habitat	RR milepost 45.6 Osprey nest nearby	Unverified	-121.01810, 45.26777
<a href="#">RM 43.2</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Buck Hollow Creek	Buck Hollow	Hwy. 216 on east bank near Sherars Bridge	Buck Hollow Creek	RR milepost 45.8 Osprey nest nearby	Unverified	-121.02260, 45.26407
<a href="#">RM 44.2</a>	Deflection	(1) 100'	Use 1 section (100') to send oil into main channel and protect ODFW fish ladder	Sherars Bridge	Hwy. 216 on west bank	ODFW fish ladder	RR milepost 47.0 Road to rail access Osprey nest nearby	Unverified	-121.03793, 45.25669
<a href="#">RM 45.4</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Sandy Beach	East bank of river, dirt road approximately 1.1 miles south from Hwy. 216	Downstream habitat	RR milepost 48.0	Unverified	-121.04781, 45.24214
<a href="#">RM 49.3</a>	Collection	(9) 50'	Use 9 sections (500') of collection boom off of east bank	Blue Hole	East bank of river, dirt road north from Maupin approximately 3.0 miles to Blue Hole	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 51.4	Unverified	-121.07317, 45.21135
<a href="#">RM 50.0</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Grey Eagle	East bank of river, dirt road north from Maupin approximately 1.8 miles to Grey Eagle	Downstream habitat	RR milepost 52.6	Unverified	-121.08120, 45.19549
<a href="#">RM 51.8</a>	Collection / Deflection	(10) 50' (1) 200'	Use 10 sections (50') of collection boom off of east bank. Use 1 section (200') to send oil into main channel and protect Bakeoven Creek	Maupin City Park	Maupin City Park on east bank of river	Bakeoven Creek / downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 54.4 Road to rail access, helicopter access. This strategy is the second priority to be fulfilled if an accident happens upstream of Maupin.	Unverified	-121.07318, 45.17395
<a href="#">RM 55.8</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Harpham Flat Camp	East bank of river, dirt road south from Maupin approximately 3.7 miles to Harpham Flat	Downstream habitat	RR milepost 58.7	Unverified	-121.12082, 45.13571
<a href="#">RM 59.0</a>	Collection	(12) 50'	Use 12 sections (50') of collection boom off of east bank	Nena	East bank of river, dirt road south from Maupin approximately 7.1 miles to locked gate (contact BLM to obtain gate access)	Downstream habitat	RR milepost 62.0	Unverified	-121.12757, 45.09333





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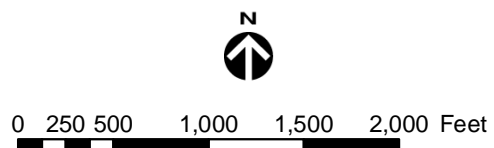
[Link to next strategy](#)

[Link to overview map](#)

## Strategies 42.8 and 43.2

Proposed Booming and Collection Strategies

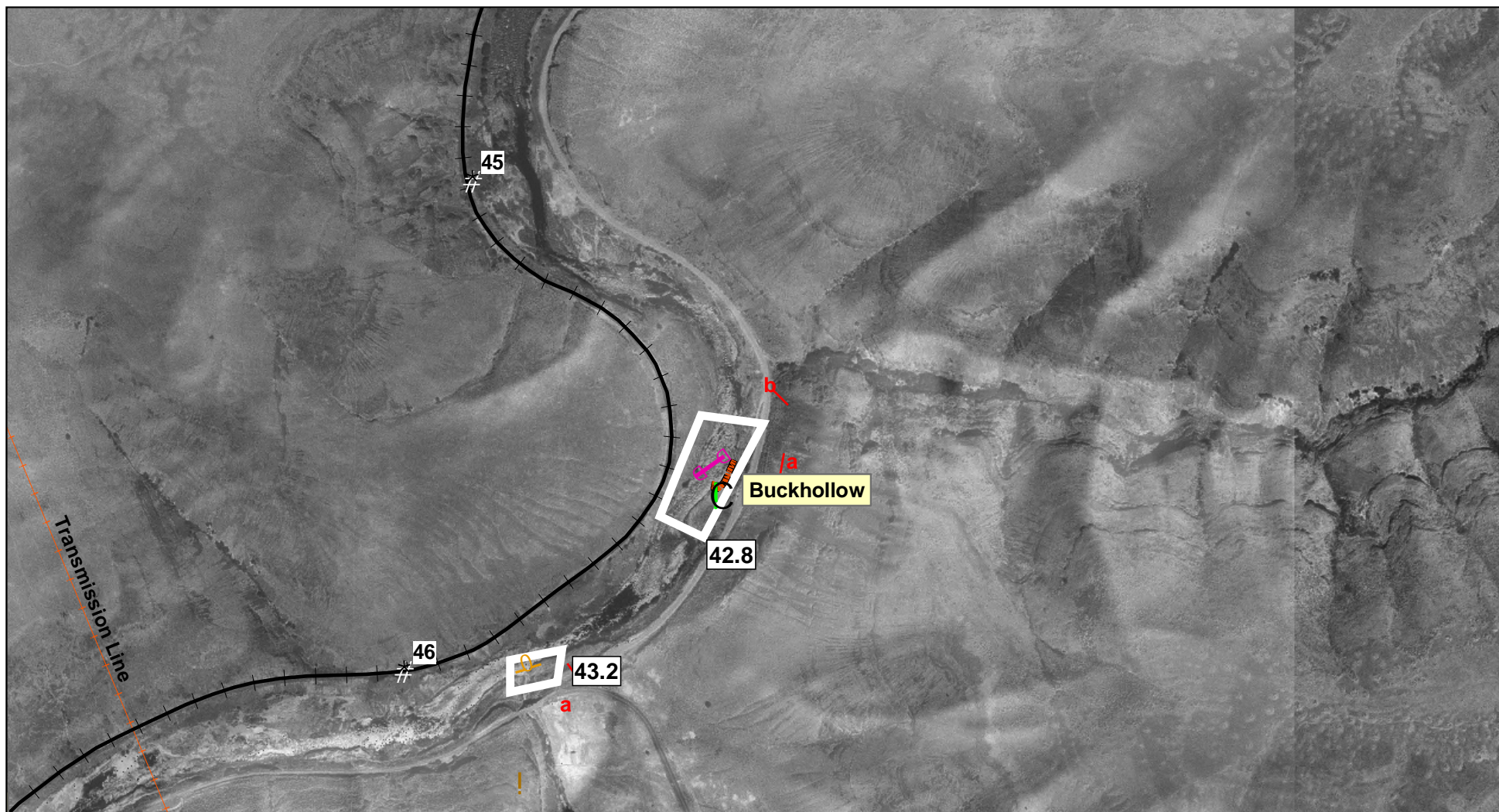
Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed





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[Link to overview map](#)

## Strategies 42.8 and 43.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-13. Strategies 42.8 and 43.2 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 42.8</a>	Collection	(8) 50'	Use 5 sections (50') of short skirt boom to deflect oil to east side; use 3 sections (50') of short skirt boom to collect oil at shore	Buck Hollow	East bank of river, dirt road approximately 0.4 miles north from Hwy. 216 to Buck Hollow	Downstream habitat	RR milepost 45.6 Osprey nest nearby	Unverified	-121.01810, 45.26777
<a href="#">RM 43.2</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Buck Hollow Creek	Buck Hollow	Hwy. 216 on east bank near Sherars Bridge	Buck Hollow Creek	RR milepost 45.8 Osprey nest nearby	Unverified	-121.02260, 45.26407



**River Mile 42.8a:** Looking west from east side road. Note river access and use of trees and rocks to anchor boom.

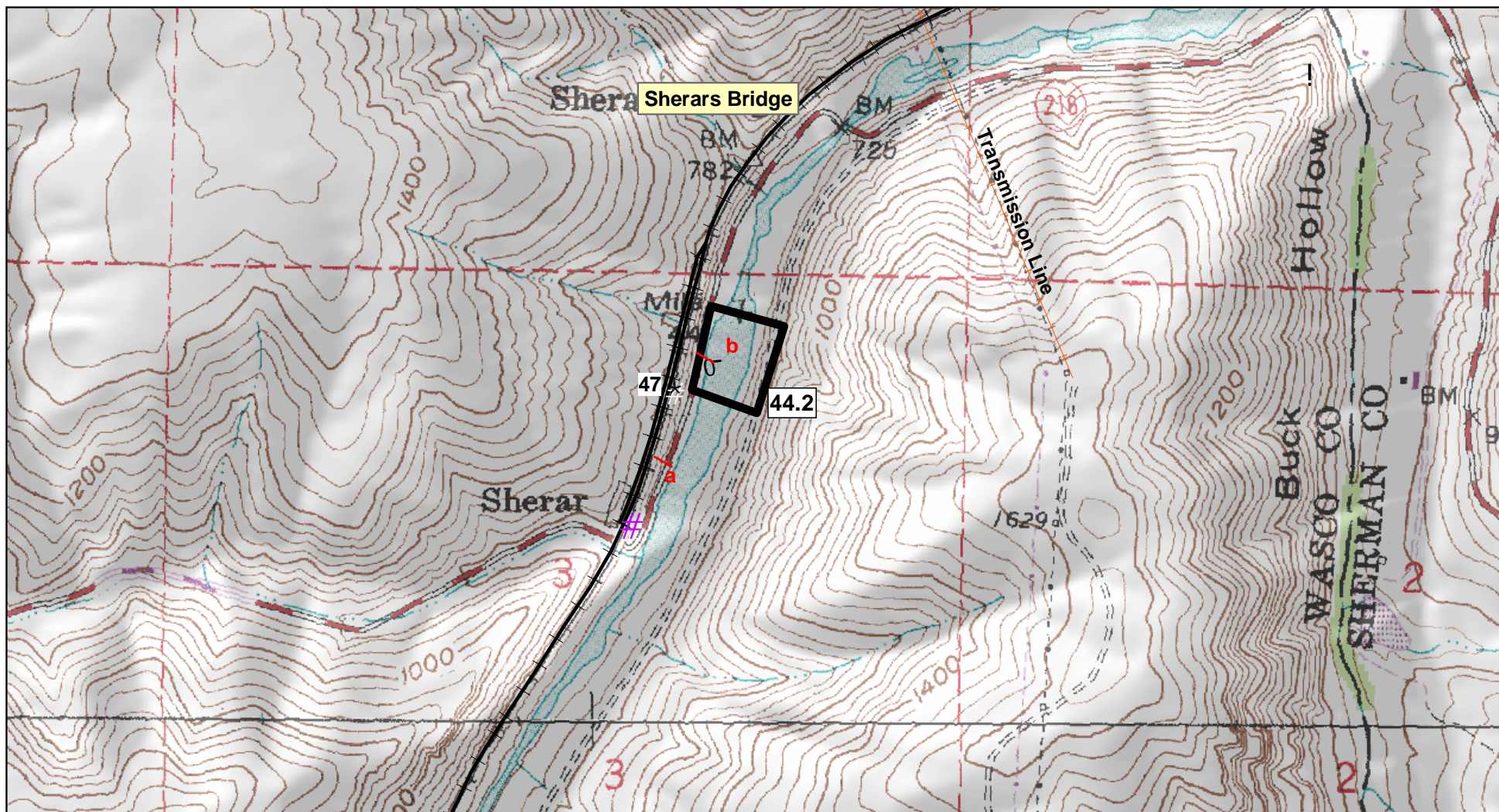


**River Mile 42.8b:** Looking south at Strategy 42.8. Trees and rocks were useful in exercise.



**River Mile 43.2:** Looking south from east side access road at Strategy 43.2. Note difficult river access.





[Link to specific strategy information](#)

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[Link to overview map](#)

## Strategy 44.2

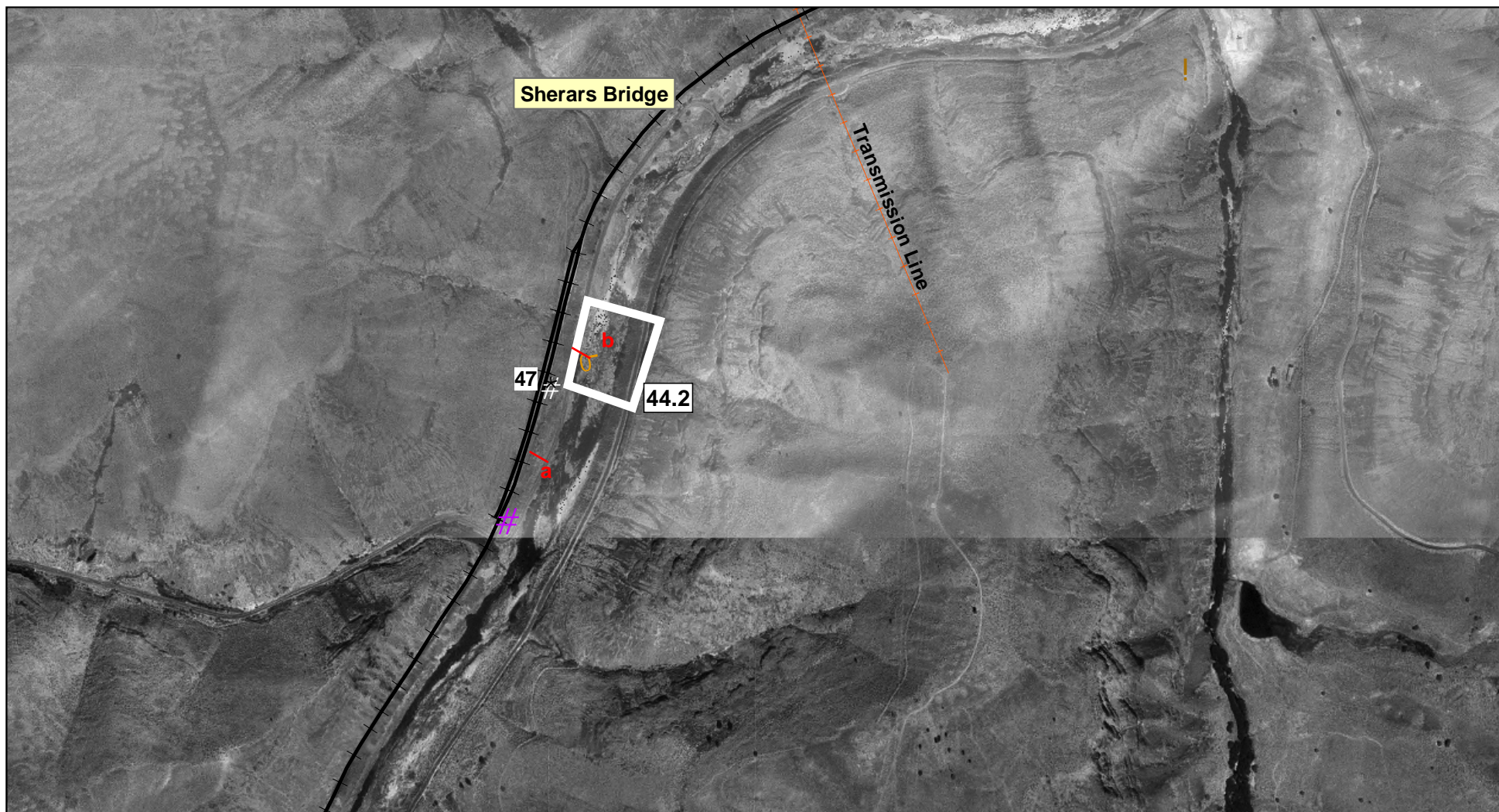
Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





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## Strategy 44.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		*5 Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-14. Strategy 44.2 – Booming Strategies and Resources Protected**

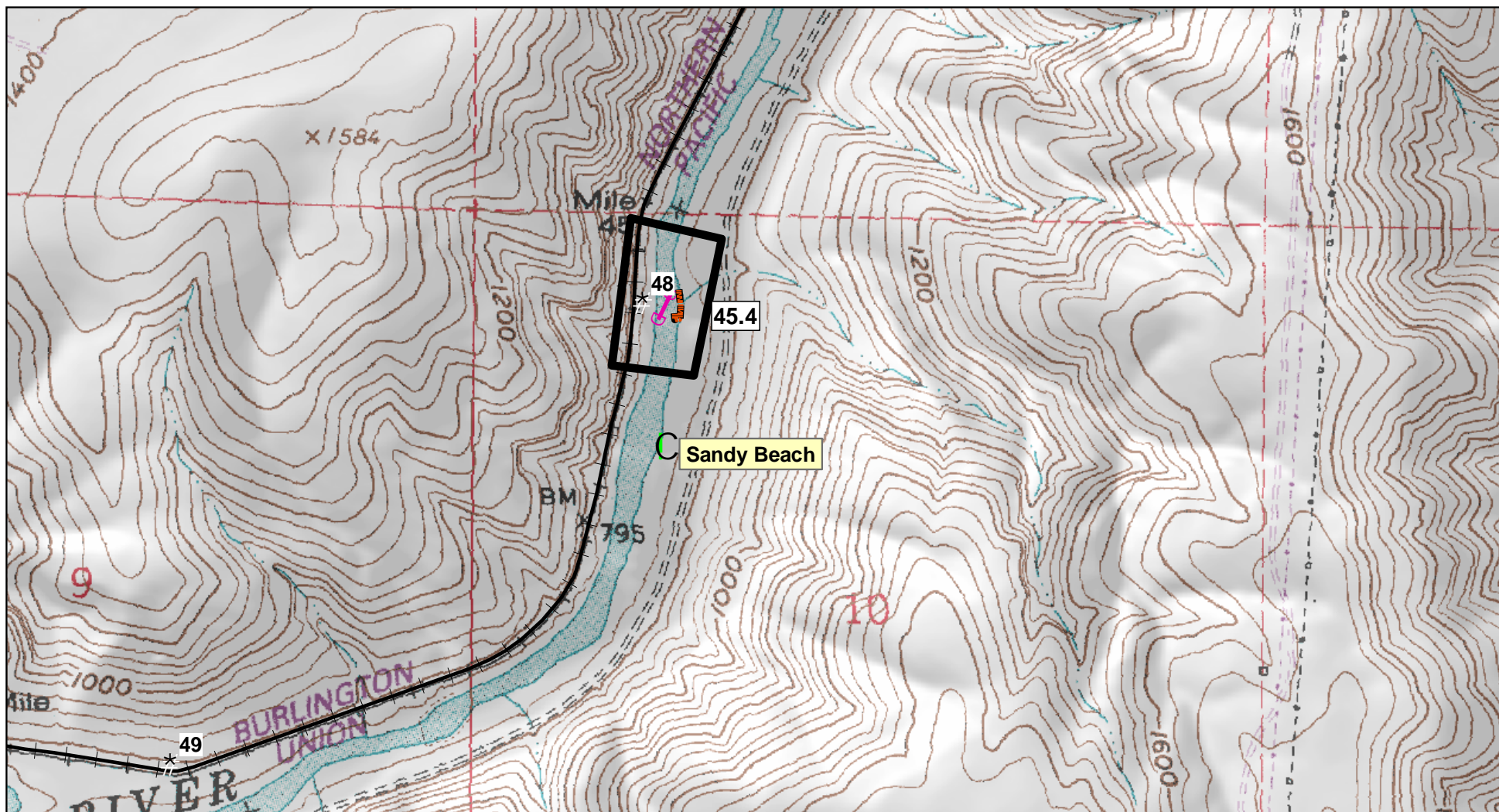
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
RM 44.2	Deflection	(1) 100'	Use 1 section (100') to send oil into main channel and protect ODFW fish ladder	Sherars Bridge	Hwy. 216 on west bank	ODFW fish ladder	RR milepost 47.0 Road to rail access Osprey nest nearby	Unverified	-121.03793, 45.25669



**River Mile 44.2a:** Looking northeast from west side road at Strategy 44.2. Boom should be placed in calm area just above Sherars Falls.



**River Mile 44.2b:** Looking northeast from west bank. Note calm water above falls.



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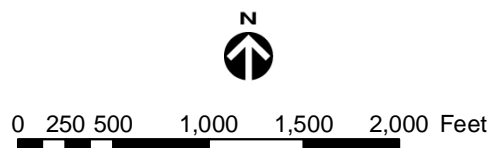
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 45.4

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





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[Link to overview map](#)

## Strategy 45.4

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

0 250 500 1,000 1,500 2,000 Feet



### Legend

	Response strategy area		Boat ramp
	Response Objective		*5 Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

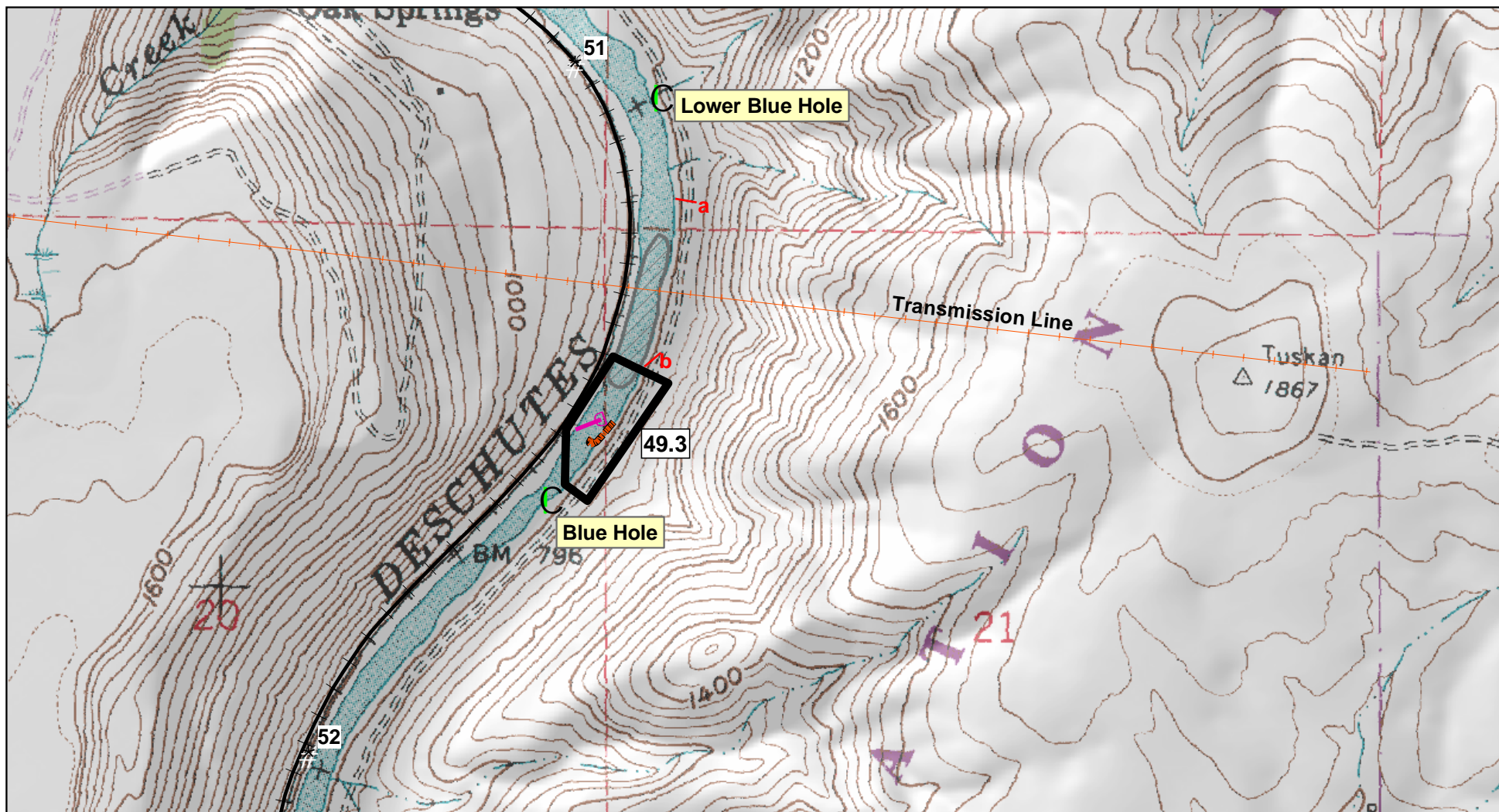
**Table 4-15. Strategy 45.4 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 45.4</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Sandy Beach	East bank of river, dirt road approximately 1.1 miles south from Hwy. 216	Downstream habitat	RR milepost 48.0	Unverified	-121.04781, 45.24214

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[Link to specific strategy information](#)

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[Link to overview map](#)

## Strategy 49.3

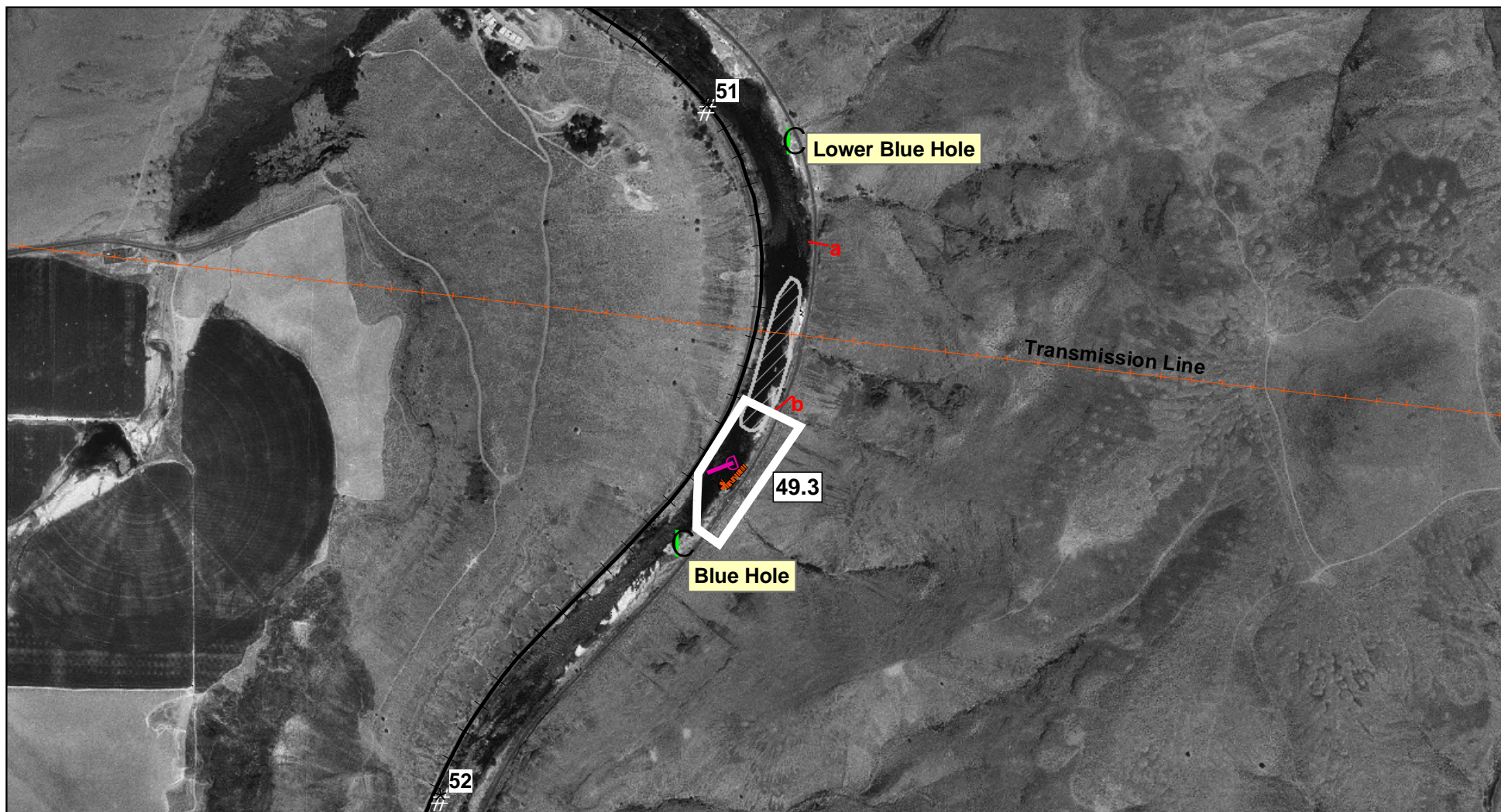
Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed





[Link to specific strategy information](#)

[Link to previous strategy](#)

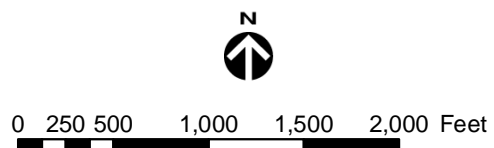
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 49.3

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



Legend	
	Response strategy area
Response Objective	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed



**Table 4-16. Strategy 49.3 – Booming Strategies and Resources Protected**

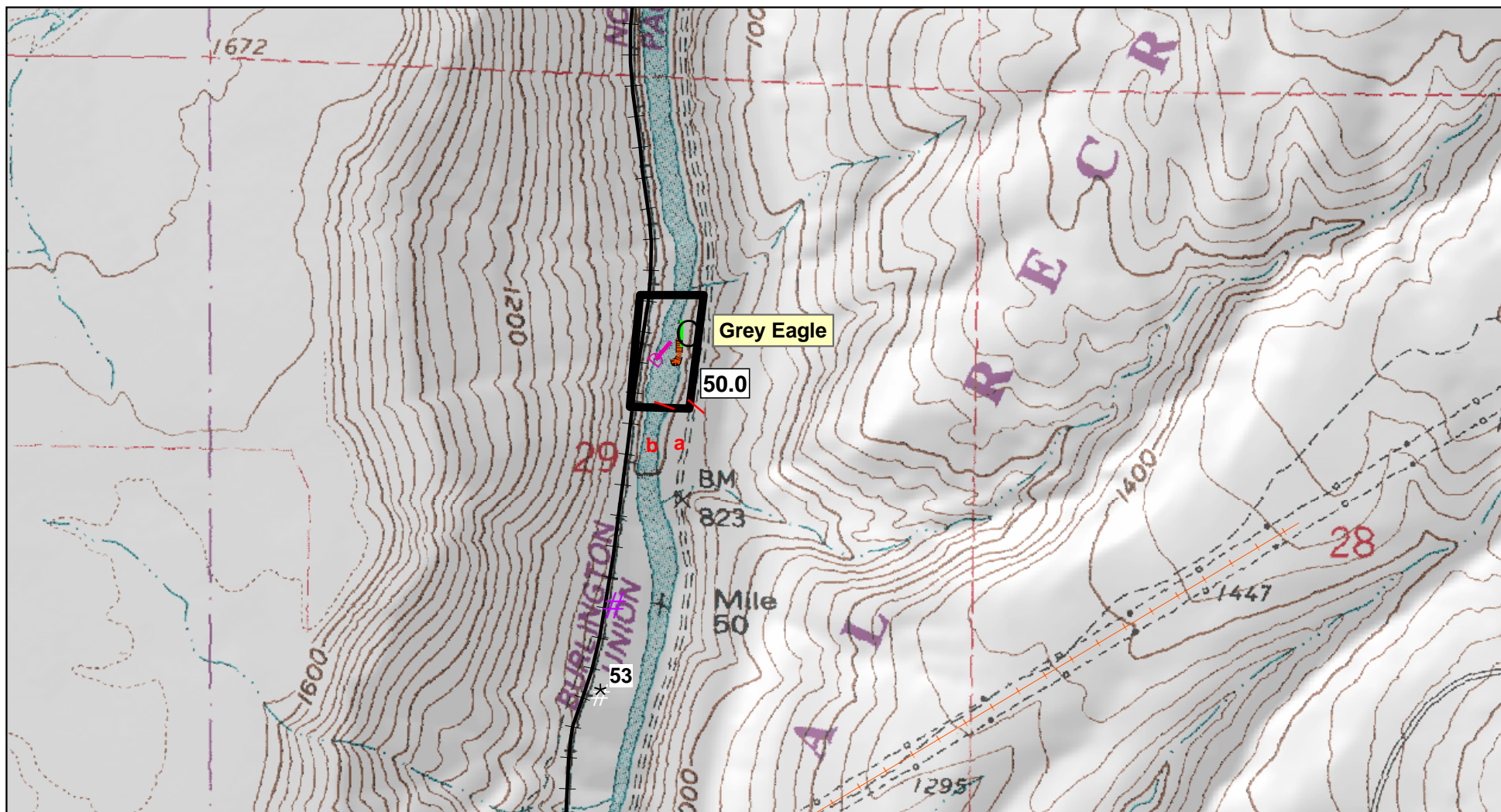
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 49.3</a>	Collection	(9) 50'	Use 9 sections (500') of collection boom off of east bank	Blue Hole	East bank of river, dirt road north from Maupin approximately 3.0 miles to Blue Hole	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 51.4	Unverified	-121.07317, 45.21135



**River Mile 49.3a:** Looking west at Strategy 49.3. Note low banks and slower water.



**River Mile 49.3b:** Looking west at Strategy 49.3. Note river access and slower water.



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[Link to previous strategy](#)

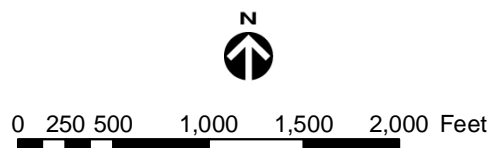
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 50.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Collection		Railroad milepost
	Deflection		Photograph location and direction
	Diversion		Location where roads cross railroad tracks
			2001 Osprey nest sighting (approximate location)
			Salmon spawning bed





[Link to specific strategy information](#)

[Link to previous strategy](#)

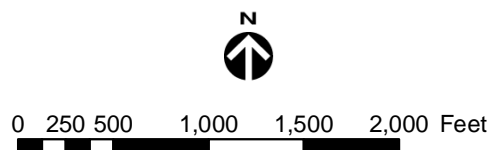
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 50.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-17. Strategy 50.0 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 50.0</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Grey Eagle	East bank of river, dirt road north from Maupin approximately 1.8 miles to Grey Eagle	Downstream habitat	RR milepost 52.6	Unverified	-121.08120, 45.19549

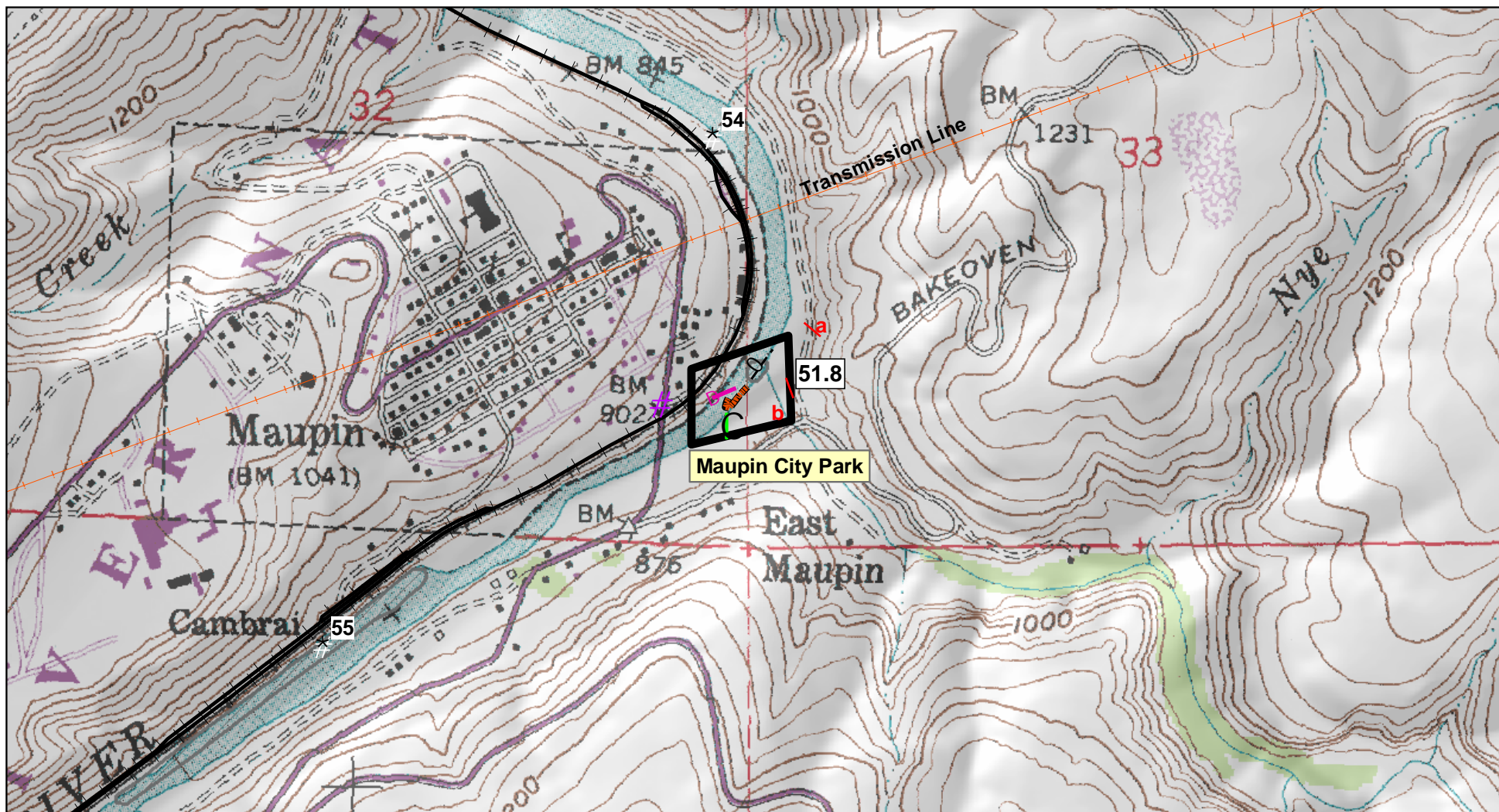


**River Mile 50.0a:** Looking west at Strategy 50.0. Note river access on west side.



**River Mile 50.0b:** Looking south from west side of river.





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 51.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

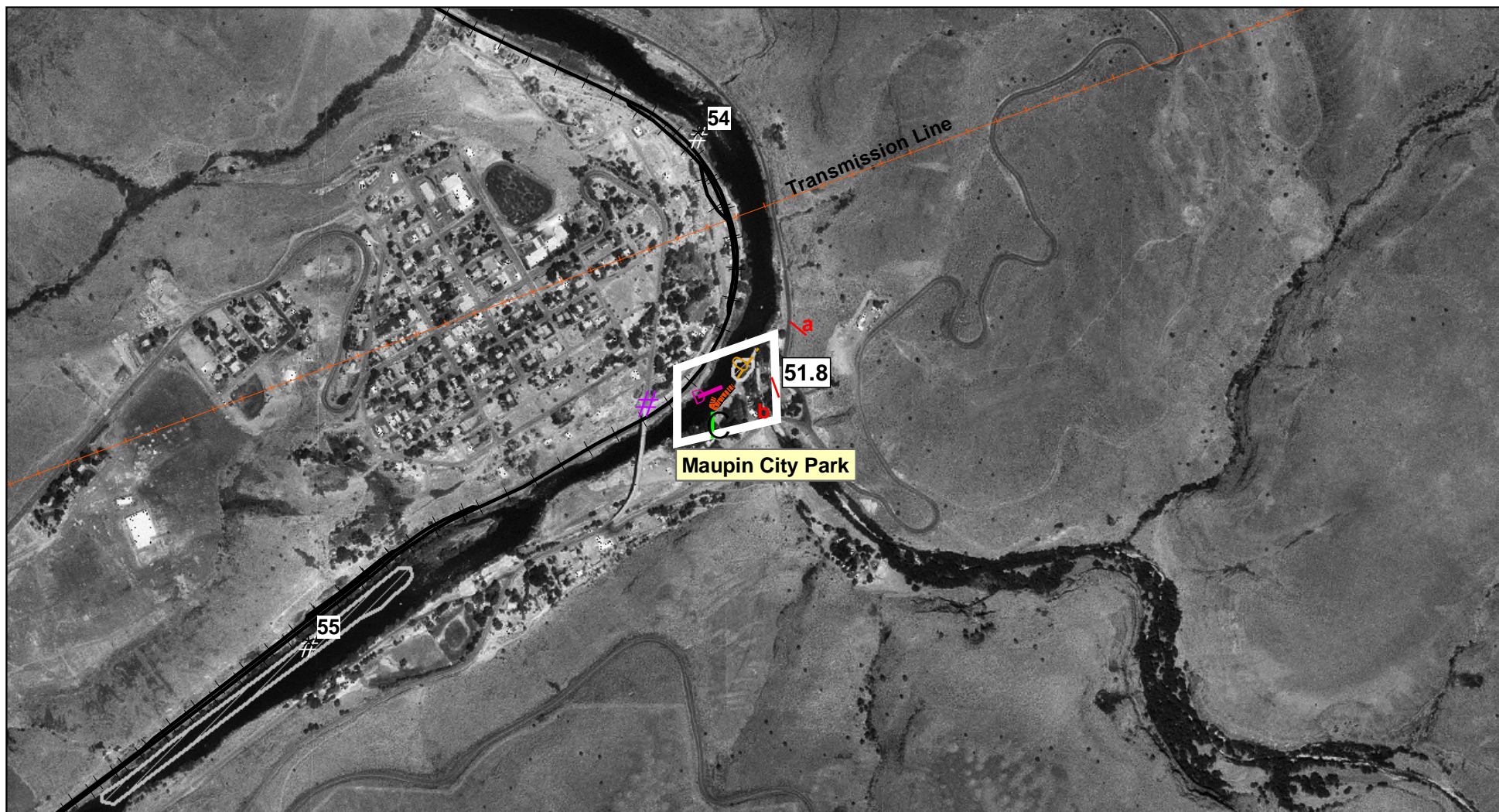
0 250 500 1,000 1,500 2,000 Feet



### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 51.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

0 250 500 1,000 1,500 2,000 Feet



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-18. Strategy 51.8 – Booming Strategies and Resources Protected**

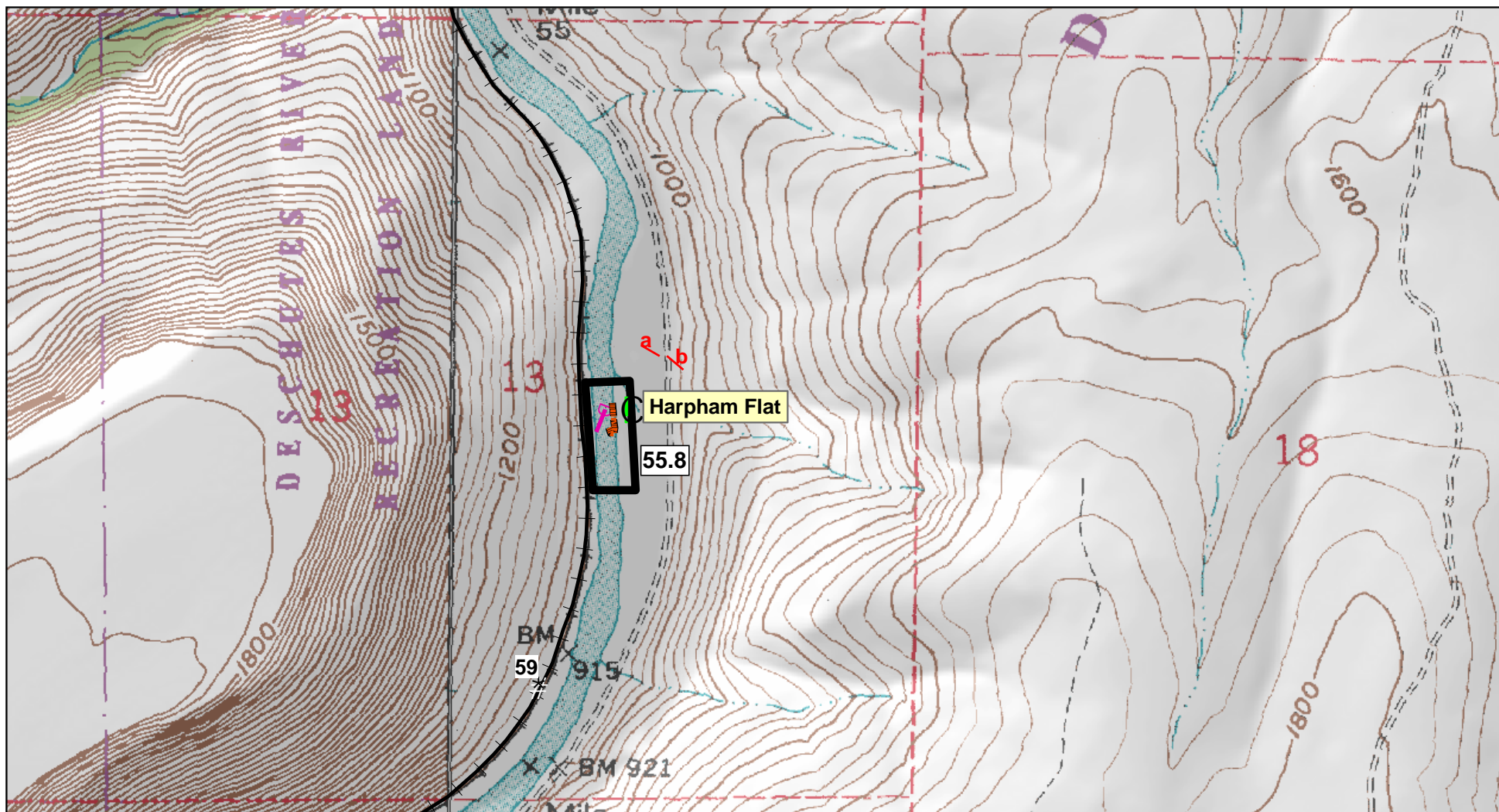
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 51.8</a>	Collection / Deflection	(10) 50' (1) 200'	Use 10 sections (50') of collection boom off of east bank. Use 1 section (200') to send oil into main channel and protect Bakeoven Creek	Maupin City Park	Maupin City Park on east bank of river	Bakeoven Creek / downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 54.4 Road to rail access, helicopter access. This strategy is the second priority to be fulfilled if an accident happens upstream of Maupin.	Unverified	-121.07318, 45.17395



**River Mile 51.8a:** Looking south from Maupin City Park. Note boat ramps, trees, slow moving water.



**River Mile 51.8b:** Looking south from Maupin City Park. Note boat ramps, trees, slow moving water.



[Link to specific strategy information](#)

[Link to previous strategy](#)

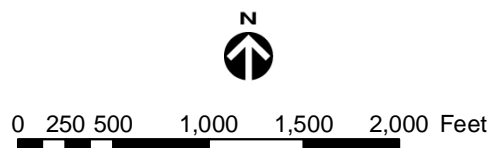
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 55.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

- |                        |  |
|------------------------|--|
| Response strategy area | Boat ramp  |
| Response Objective     | Railroad milepost                                |
| Collection             | Photograph location and direction                |
| Deflection             | Location where roads cross railroad tracks       |
| Diversion              | 2001 Osprey nest sighting (approximate location) |
|                        | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)

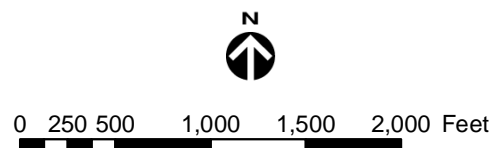
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 55.8

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-19. Strategy 55.8 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 55.8</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Harpham Flat Camp	East bank of river, dirt road south from Maupin approximately 3.7 miles to Harpham Flat	Downstream habitat	RR milepost 58.7	Unverified	-121.12082, 45.13571

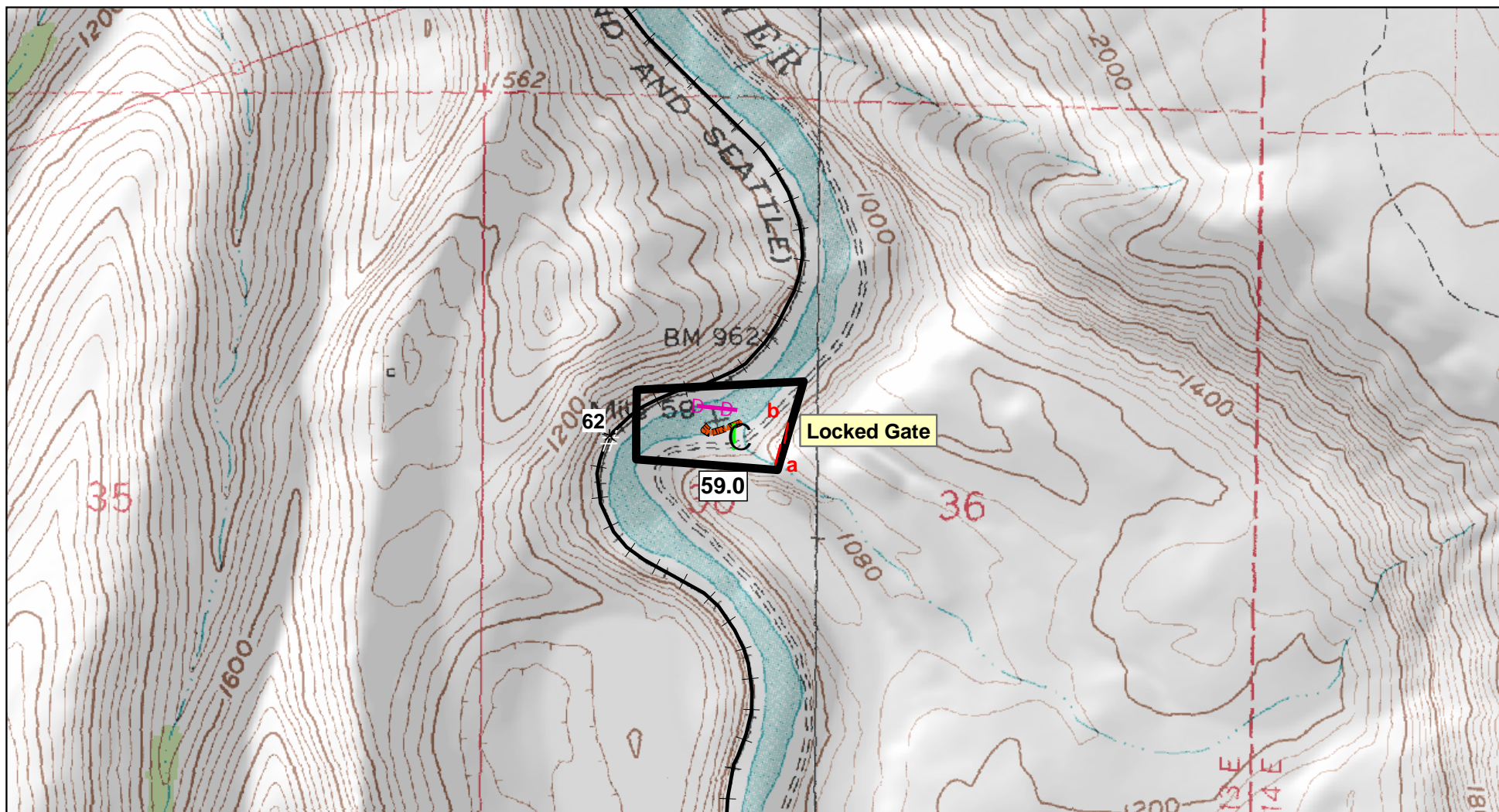


**River Mile 55.8a:** Looking southwest from Harpham Flat boat ramp. Note river access.



**River Mile 55.8b:** Looking southwest from Harpham Flat boat ramp. Note eddy on east side bank.





[Link to specific strategy information](#)

[Link to previous strategy](#)

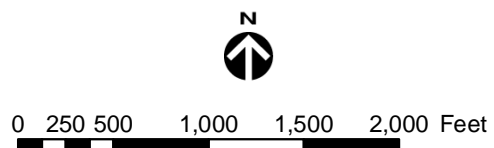
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 59.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

Response strategy area	Boat ramp
<b>Response Objective</b>	Railroad milepost
Collection	Photograph location and direction
Deflection	Location where roads cross railroad tracks
Diversion	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed



[Link to specific strategy information](#)

[Link to previous strategy](#)

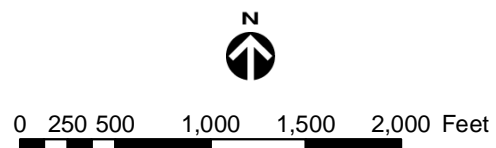
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 59.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Collection		Railroad milepost
	Deflection		Photograph location and direction
	Diversion		Location where roads cross railroad tracks
			2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-20. Strategy 59.0 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 59.0</a>	Collection	(12) 50'	Use 12 sections (50') of collection boom off of east bank	Nena	East bank of river, dirt road south from Maupin approximately 7.1 miles to locked gate (contact BLM to obtain gate access)	Downstream habitat	RR milepost 62.0	Unverified	-121.12757, 45.09333

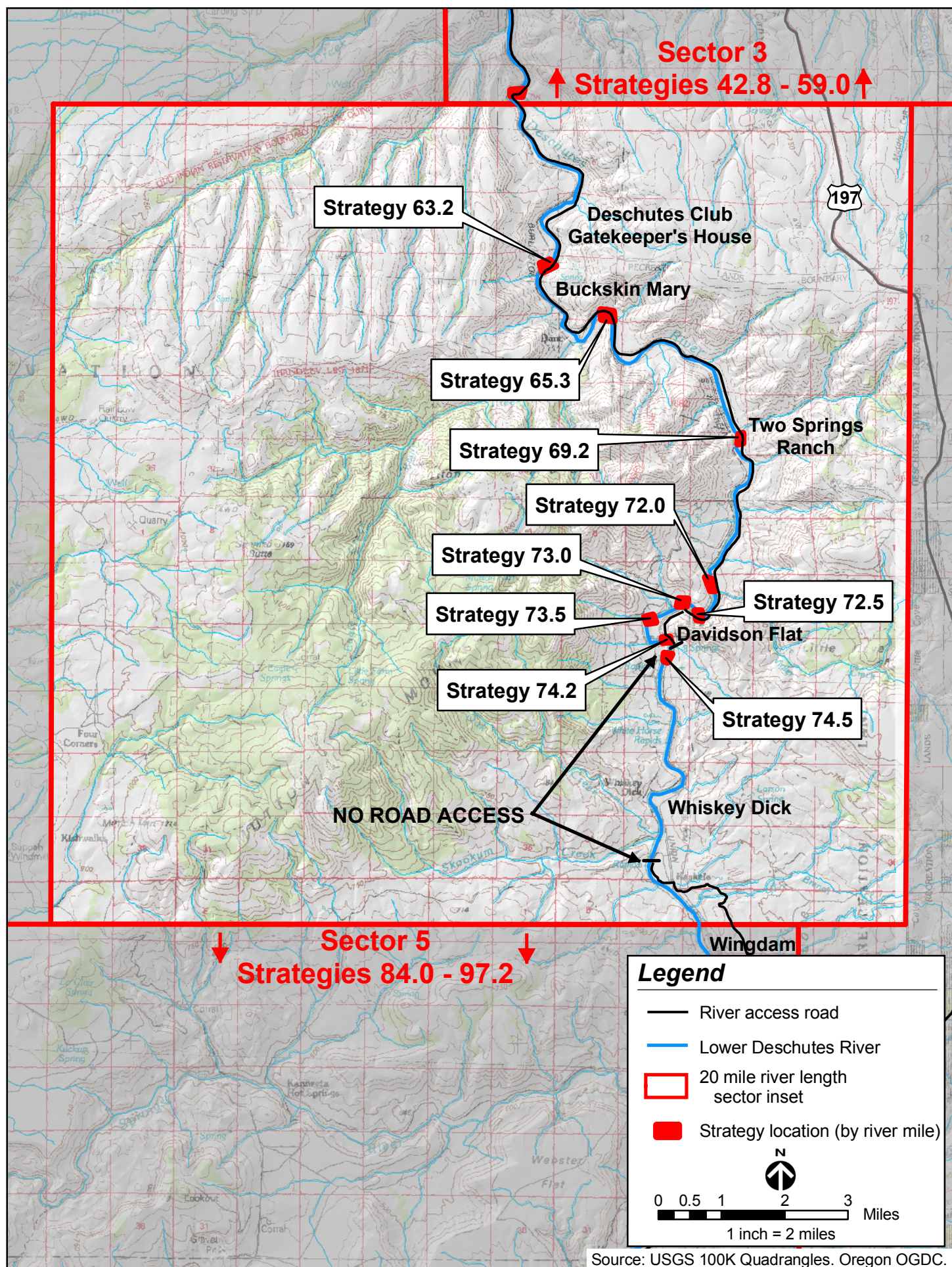


**River Mile 59.0a:** Looking west from BLM picnic area. Note road and river access, as well as locked gate. Contact BLM to obtain access south of gate.



**River Mile 59.0b:** Looking west from river access point at BLM picnic area. Note trees and river access.





**Figure 4d. Sector 4 (Strategies 63.2 - 74.5) index map of the Lower Deschutes River Geographic Response Plan.**



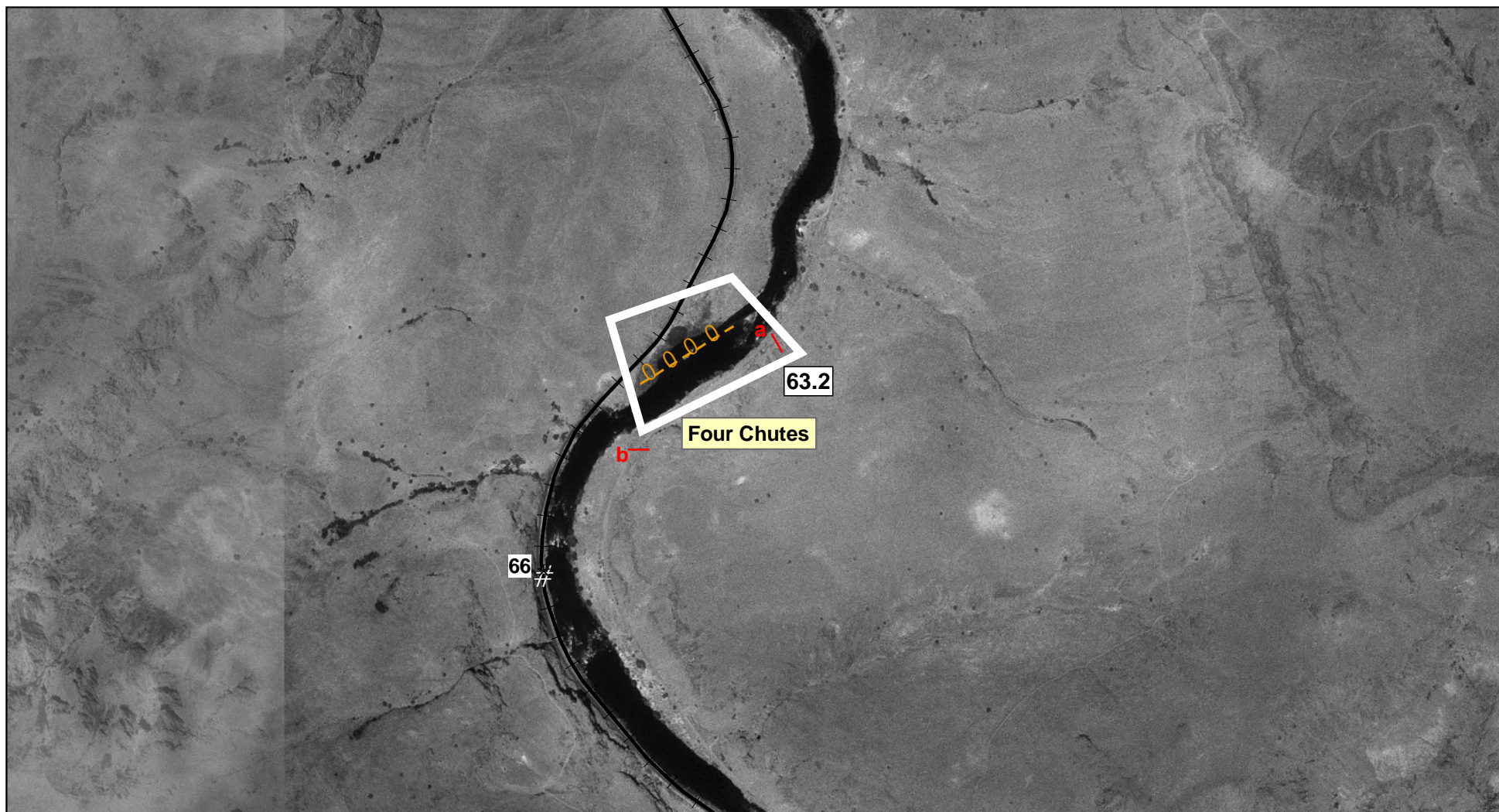
## Lower Deschutes River Geographic Response Plan

**Table 4d. Strategies 63.2 through 74.5 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 63.2</a>	Deflection	(13) 50'	Use 13 sections (50') to send oil into main channel and protect west bank habitat	Four Chutes	East bank of river, dirt road south from Maupin approximately 11.0 miles past Deschutes Club	West bank habitat	RR milepost 65.7	Unverified	-121.11747, 45.05366
<a href="#">RM 65.3</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Windy Flat	East bank of river, dirt road south from Maupin approximately 13.0 miles past Deschutes Club	Downstream habitat	RR milepost 68.0	Unverified	-121.09782, 45.04234
<a href="#">RM 69.2</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Two Springs Ranch	East bank of river, dirt road south from Maupin approximately 16.7 miles to Two Springs Ranch	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 71.8 Osprey nest nearby Contact USFWS before implementing this strategy.	Unverified	-121.05445, 45.01422
<a href="#">RM 72.0</a>	Deflection	(1) 300'	Use 1 section (300') to send oil into main channel and protect island back channels	North Junction	East bank of river, dirt road south from Maupin approximately 19.3 miles to North Junction	West bank river channel	RR milepost 74.3 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.06364, 44.98079
<a href="#">RM 72.5</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	North Junction	East bank of river, dirt road south from Maupin approximately 20.0 miles to North Junction	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 74.8 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.06760, 44.97365
<a href="#">RM 73.0</a>	Deflection	(2) 200'	Use sections to send oil into main channel and protect west bank of island back channel	North Junction	East bank of river, dirt road south from Maupin approximately 20.3 miles to North Junction	Fish habitat west of islands, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 75.1 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.07285, 44.97657
<a href="#">RM 73.5</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Davidson Flat	East bank of river, dirt road south from Maupin or hi-rail approximately 20.3 miles on railroad tracks	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 75.6 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.08329, 44.97262
<a href="#">RM 74.2</a>	Collection	(11) 50'	Use 11 sections (50') of collection boom off of east bank	Davidson Flat	East bank of river, dirt road south from Maupin approximately 20.3 miles or hi-rail on railroad tracks	Downstream habitat	RR milepost 75.8 Outhouse facility available at RM 72.5	Unverified	-121.07799, 44.96796
<a href="#">RM 74.5</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Davidson Flat	Hi-rail on railroad tracks from Maupin	Downstream habitat	RR milepost 76.1	Unverified	-121.07775, 44.96394







[Link to specific strategy information](#)

[Link to previous strategy](#)

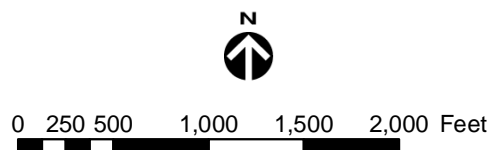
[Link to next strategy](#)

[Link to overview map](#)











## Strategy 63.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-21. Strategy 63.2 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
RM 63.2	Deflection	(13) 50'	Use 13 sections (50') to send oil into main channel and protect west bank habitat	Four Chutes	East bank of river, dirt road south from Maupin approximately 11.0 miles past Deschutes Club	West bank habitat	RR milepost 65.7	Unverified	-121.11747, 45.05366

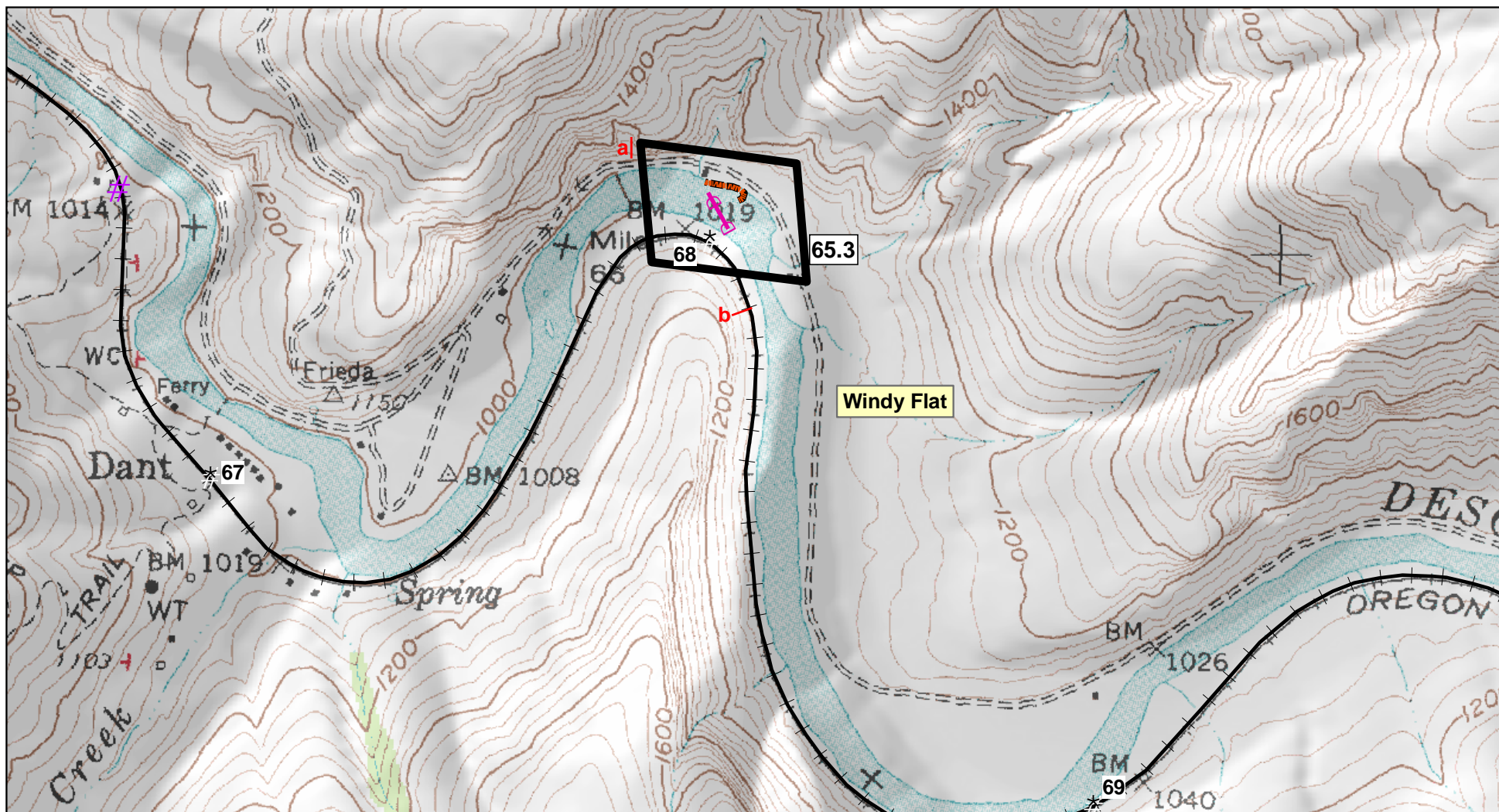


**River Mile 63.2a:** Looking southwest from east side bank at wildlife habitat on west side. Place boom in front of island to protect back channel habitat.



**River Mile 63.2b:** Looking northwest from east bank at back channel habitat in middle of photograph.





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## Strategy 65.3

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

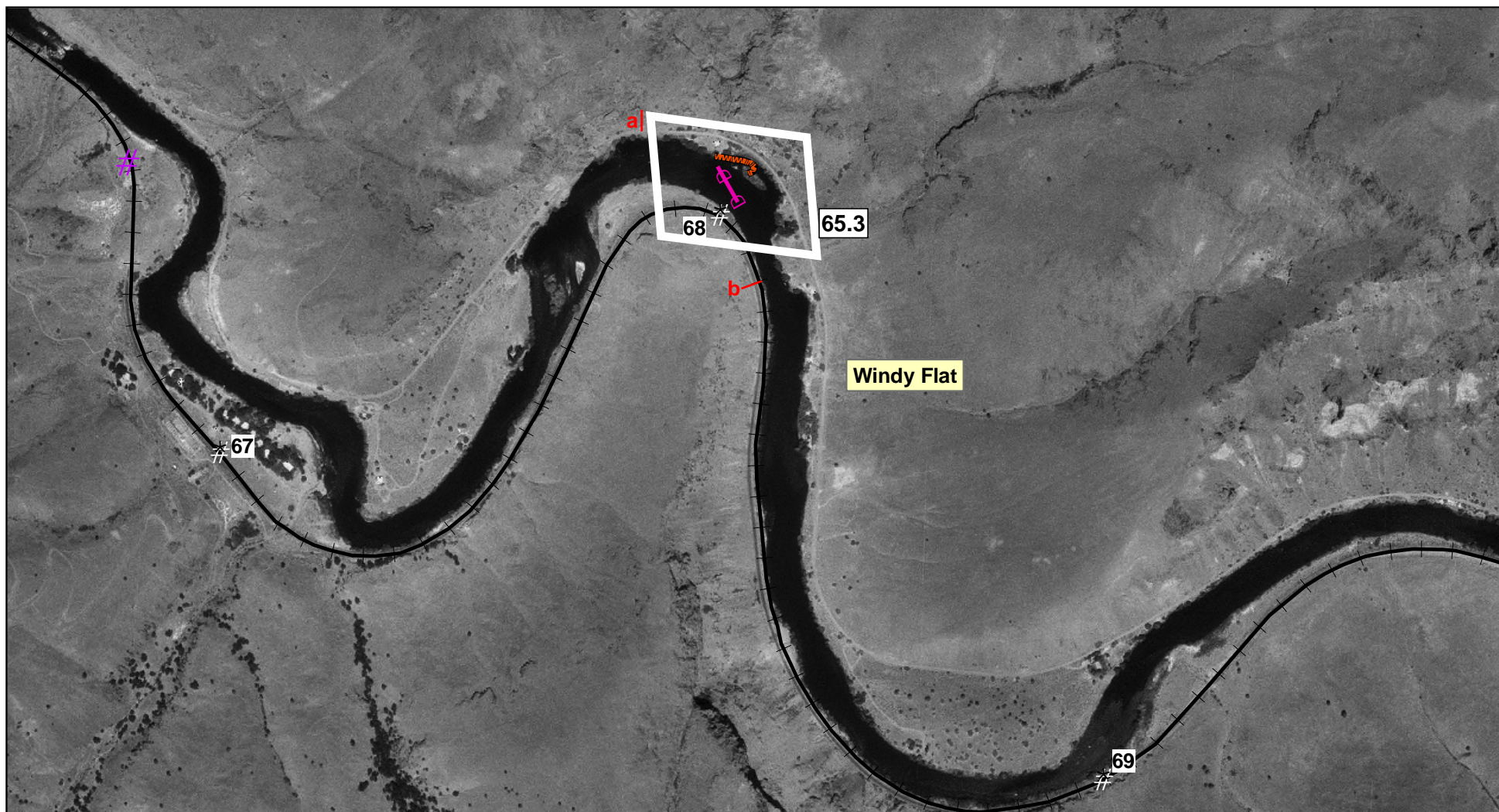


0 250 500 1,000 1,500 2,000 Feet

### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





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[Link to previous strategy](#)

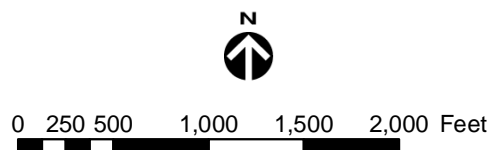
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 65.3

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



Legend	
	Response strategy area
Response Objective	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed

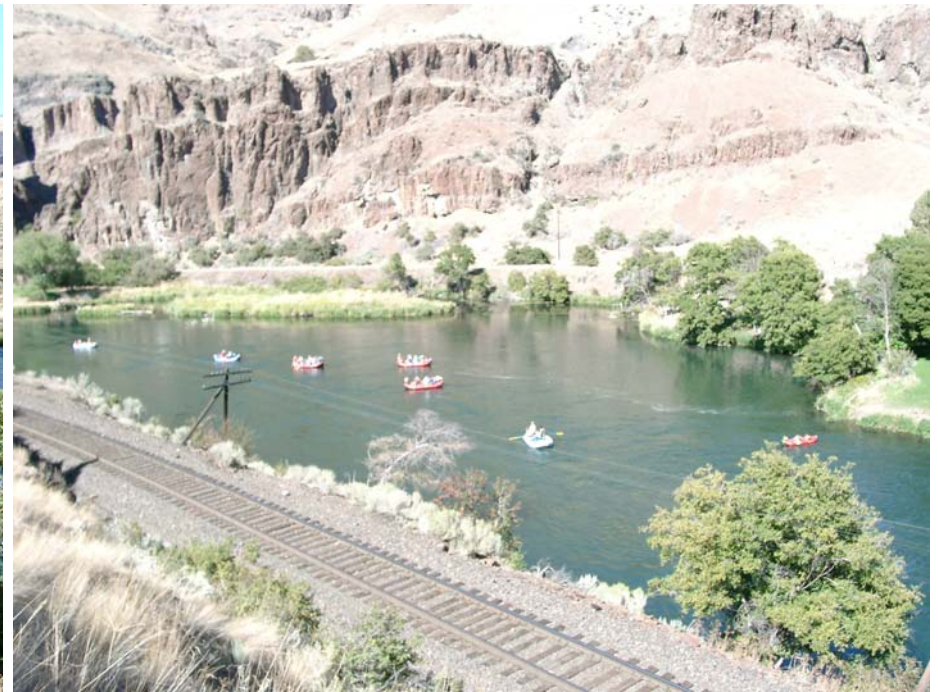


**Table 4-22. Strategy 65.3 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
RM 65.3	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Windy Flat	East bank of river, dirt road south from Maupin approximately 13.0 miles past Deschutes Club	Downstream habitat	RR milepost 68.0	Unverified	-121.09782, 45.04234



**River Mile 65.3a:** Looking south at Strategy 65.3 from east bank. Note slow moving water in middle of photograph.



**River Mile 65.3b:** Looking northeast from west bank at slow moving water.







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[Link to next strategy](#)

[Link to overview map](#)

## Strategy 69.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
<b>Response Objective</b>			Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-23. Strategy 69.2 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 69.2</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Two Springs Ranch	East bank of river, dirt road south from Maupin approximately 16.7 miles to Two Springs Ranch	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 71.8 Osprey nest nearby Contact USFWS before implementing this strategy.	Unverified	-121.05445, 45.01422

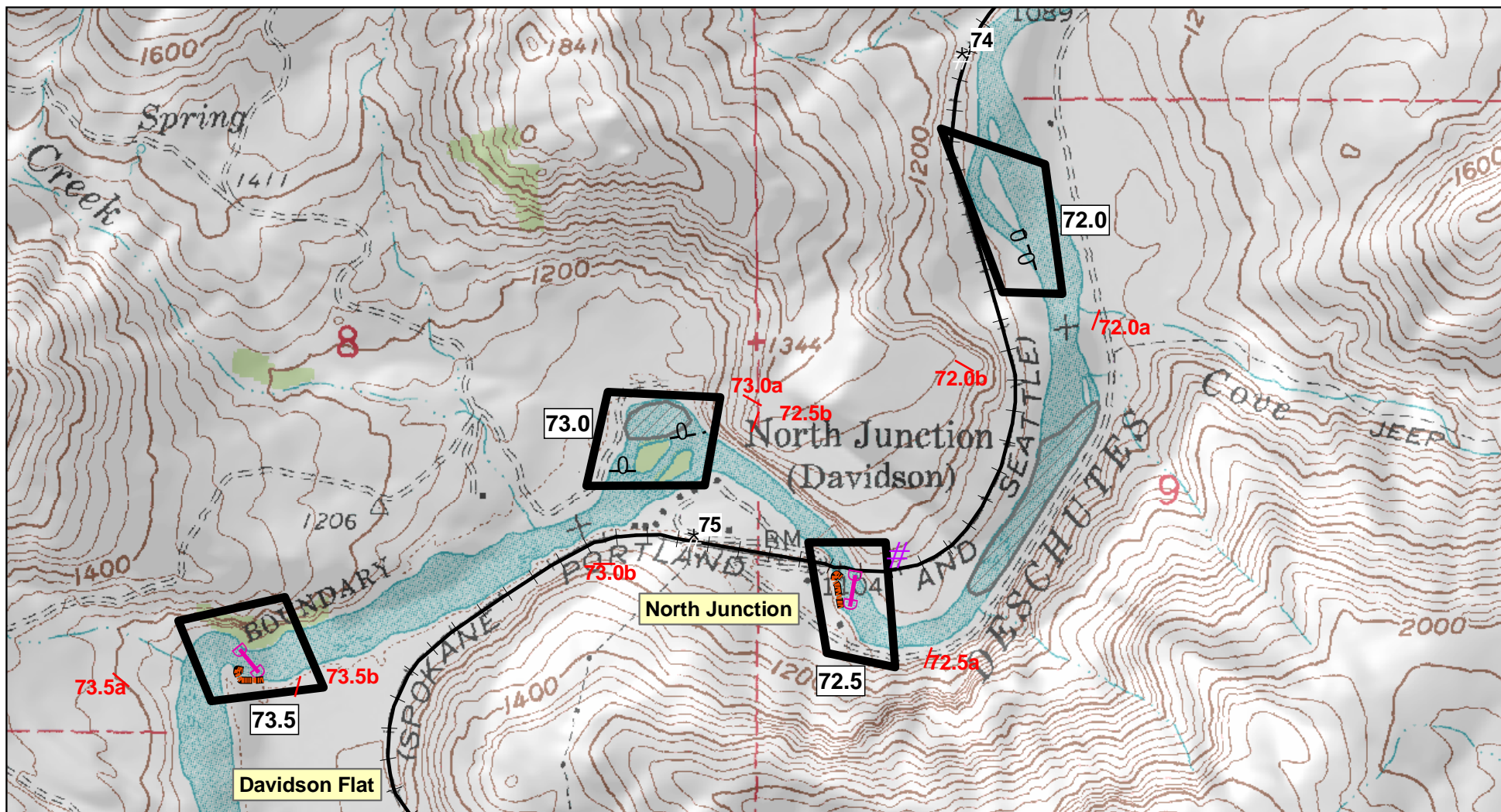


**River Mile 69.2a:** Looking northwest at Strategy 69.2 from above east bank access road. Strategy is located at bend on right side of photograph.



**River Mile 69.2b:** Looking north at Strategy 69.2 from east bank. Note slow moving water in middle of photograph.





[Link to specific strategy information](#)

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## Strategies 72.0, 72.5, 73.0, and 73.5

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

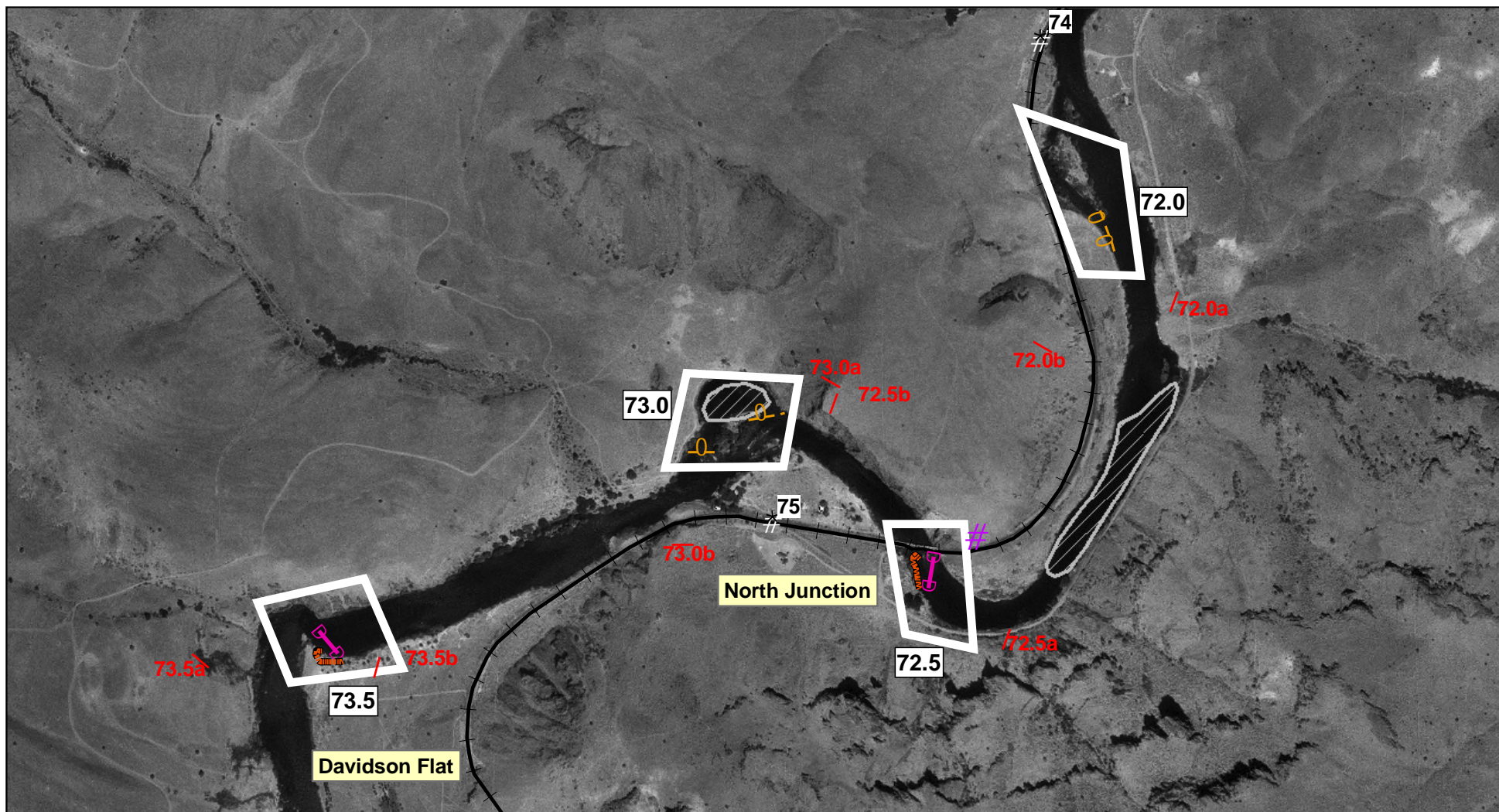


0 250 500 1,000 1,500 2,000 Feet

### Legend

- |                        |  |
|------------------------|--|
| Response strategy area | Boat ramp  |
| Response Objective     | Railroad milepost                                |
| Collection             | Photograph location and direction                |
| Deflection             | Location where roads cross railroad tracks       |
| Diversion              | 2001 Osprey nest sighting (approximate location) |
|                        | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategies 72.0, 72.5, 73.0, and 73.5

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

0 250 500 1,000 1,500 2,000 Feet



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



Table 4-24. Strategies 72.0, 72.5, 73.0, and 73.5 – Booming Strategies and Resources Protected

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 72.0</a>	Deflection	(1) 300'	Use 1 section (300') to send oil into main channel and protect island back channels	North Junction	East bank of river, dirt road south from Maupin approximately 19.3 miles to North Junction	West bank river channel	RR milepost 74.3 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.06364, 44.98079
<a href="#">RM 72.5</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	North Junction	East bank of river, dirt road south from Maupin approximately 20.0 miles to North Junction	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 74.8 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.06760, 44.97365
<a href="#">RM 73.0</a>	Deflection	(2) 200'	Use sections to send oil into main channel and protect west bank of island back channel	North Junction	East bank of river, dirt road south from Maupin approximately 20.3 miles to North Junction	Fish habitat west of islands, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 75.1 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.07285, 44.97657
<a href="#">RM 73.5</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Davidson Flat	East bank of river, dirt road south from Maupin or hi-rail approximately 20.3 miles on railroad tracks	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 75.6 Outhouse facility available at RM 72.5 Notify USFWS before implementing this strategy.	Unverified	-121.08329, 44.97262



**River Mile 72.0a:** Looking northwest from east bank. Back channel habitat to be protected is off west bank in middle of photograph.



**River Mile 72.0b:** Looking northeast at Strategy 72.0. Note back channel habitat in middle of photograph and relatively flat east side banks for vehicle access.





**River Mile 72.5a:** Looking west at Strategy 72.5 from east bank. Collection should take place just downstream of bridge on south side.



**River Mile 72.5b:** Looking east down at railroad trestle from west bank bluff. Note road access to Strategy 72.5 on southeast bank.



**River Mile 73.0a:** Looking south at Strategy 73.0. West side channel on right side of photograph should be protected due to fish habitat.



**River Mile 73.0b:** Looking north at Strategy 73.0 from east bank. West side channel on left of photograph should be protected.

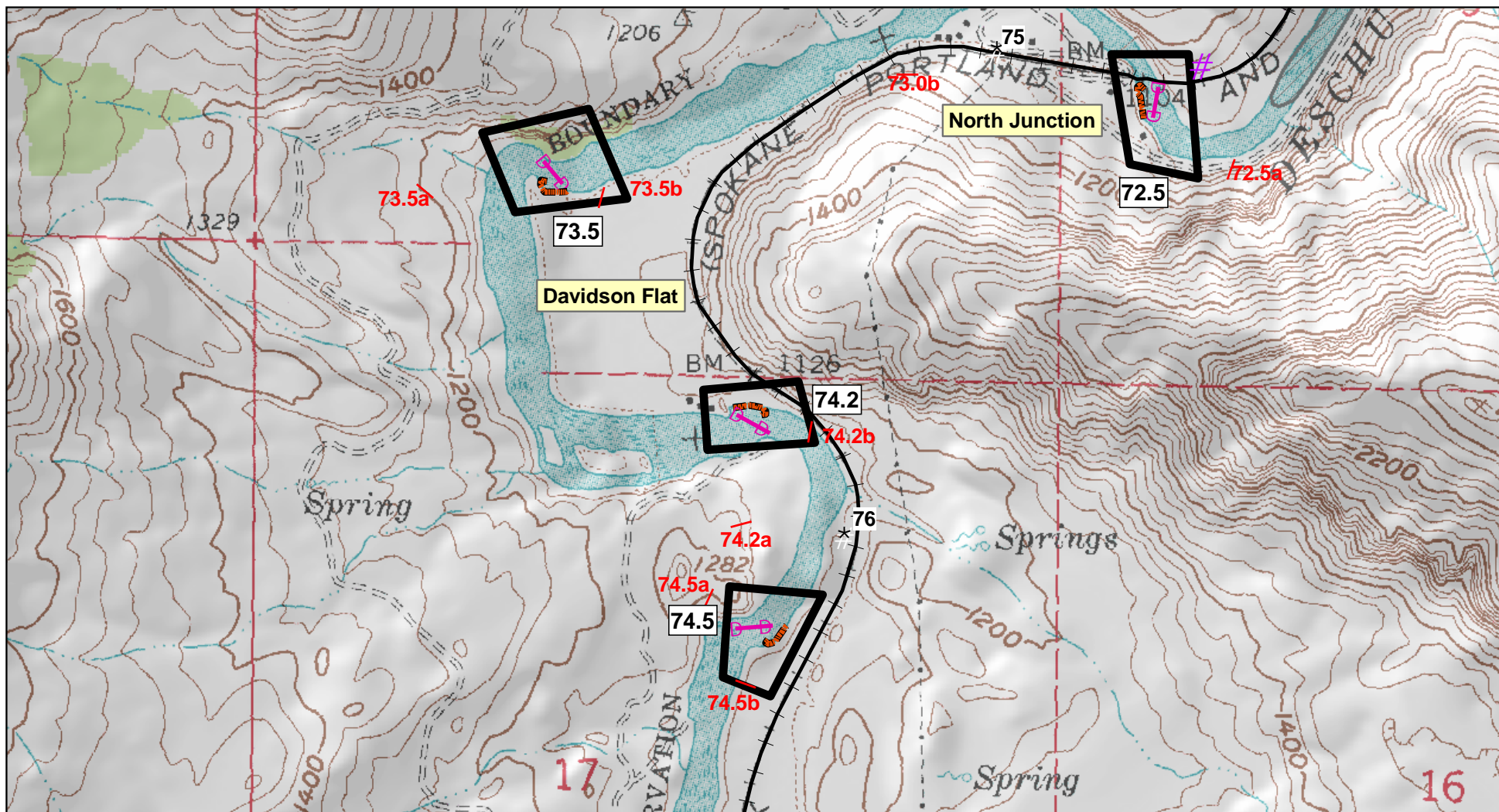




**River Mile 73.5a:** Looking north at Strategy 73.5. Boom should be placed just downstream of cliffs in order to divert product to east side.



**River Mile 73.5b:** Looking west at location where product should be diverted and collected.



[Link to specific strategy information](#)

[Link to previous strategy](#)

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## Strategy 74.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

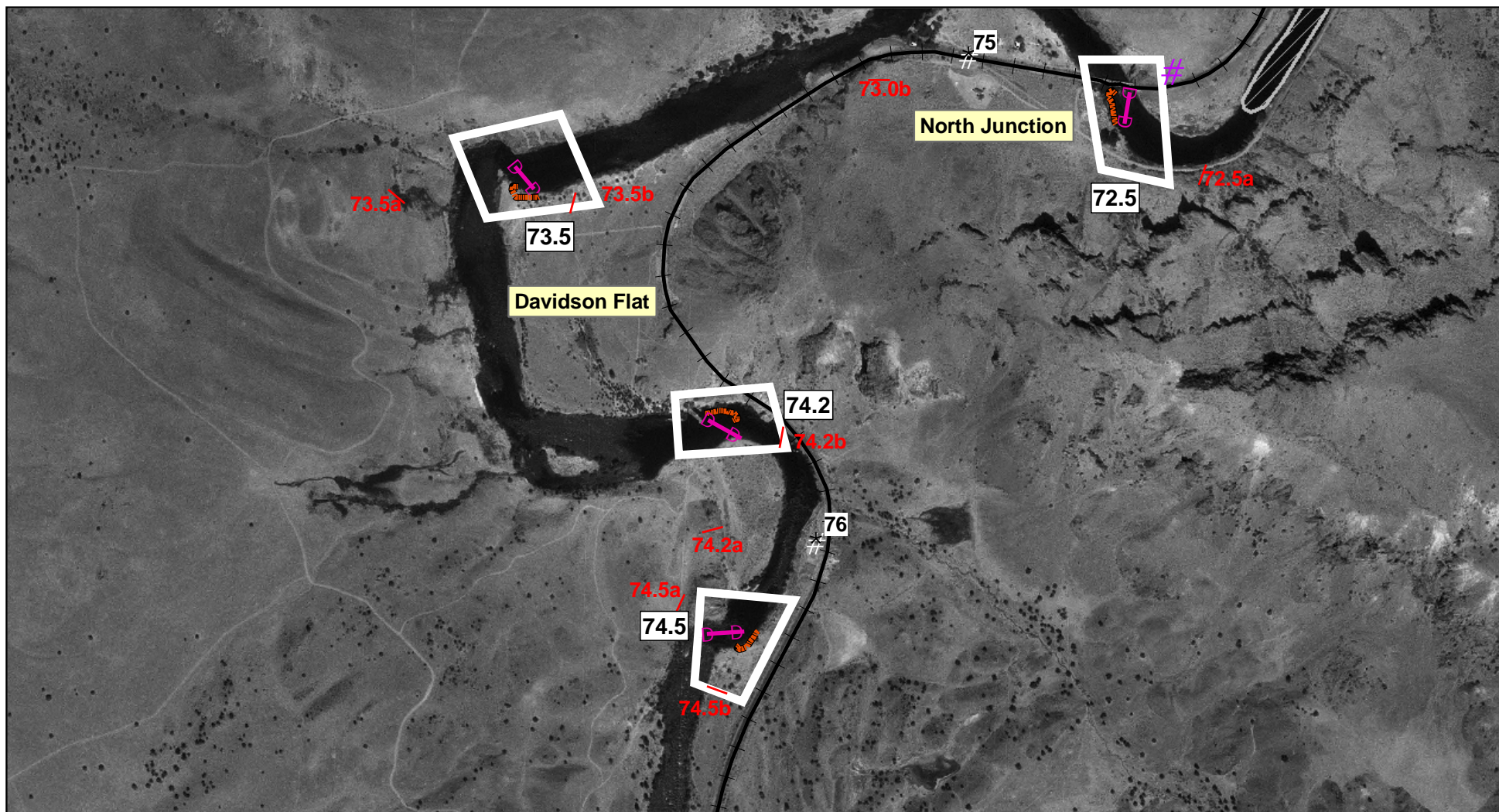
0 250 500 1,000 1,500 2,000 Feet



### Legend

- |                        |  |
|------------------------|--|
| Response strategy area | Boat ramp  |
| Response Objective     | Railroad milepost                                |
| Collection             | Photograph location and direction                |
| Deflection             | Location where roads cross railroad tracks       |
| Diversion              | 2001 Osprey nest sighting (approximate location) |
|                        | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)

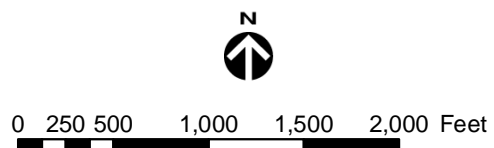
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 74.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



Legend	
	Response strategy area
Response Objective	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed



**Table 4-25. Strategy 74.2 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 74.2</a>	Collection	(11) 50'	Use 11 sections (50') of collection boom off of east bank	Davidson Flat	East bank of river, dirt road south from Maupin approximately 20.3 miles or hi-rail on railroad tracks	Downstream habitat	RR milepost 75.8 Outhouse facility available at RM 72.5	Unverified	-121.07799, 44.96796

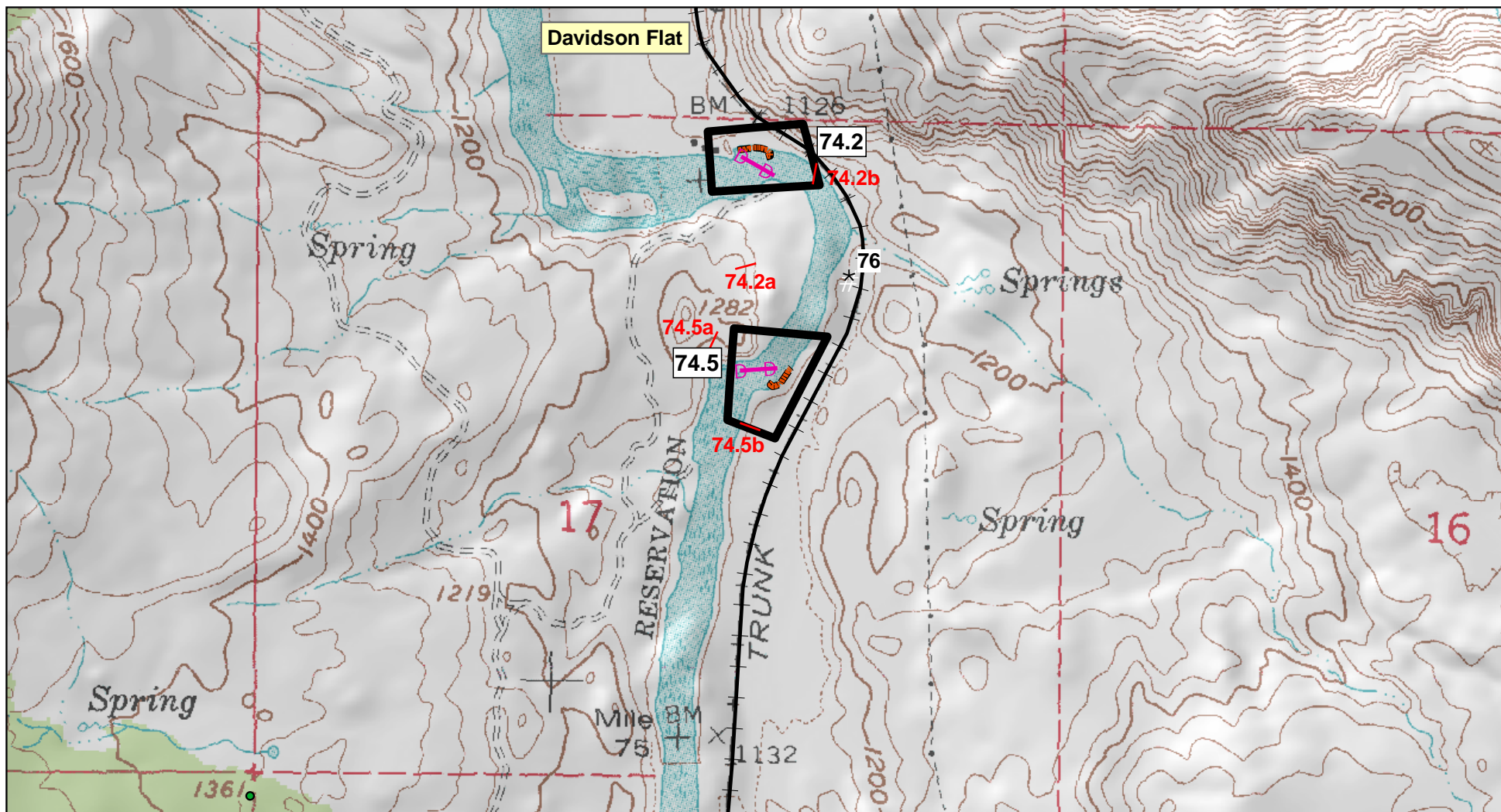


**River Mile 74.2a:** Looking northeast at Strategy 74.2. Product should be diverted to behind rock bluff on left of photograph.



**River Mile 74.2b:** Looking west at location where product should be diverted behind rock bluff on right side of photograph.





[Link to specific strategy information](#)

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[Link to next strategy](#)

[Link to overview map](#)

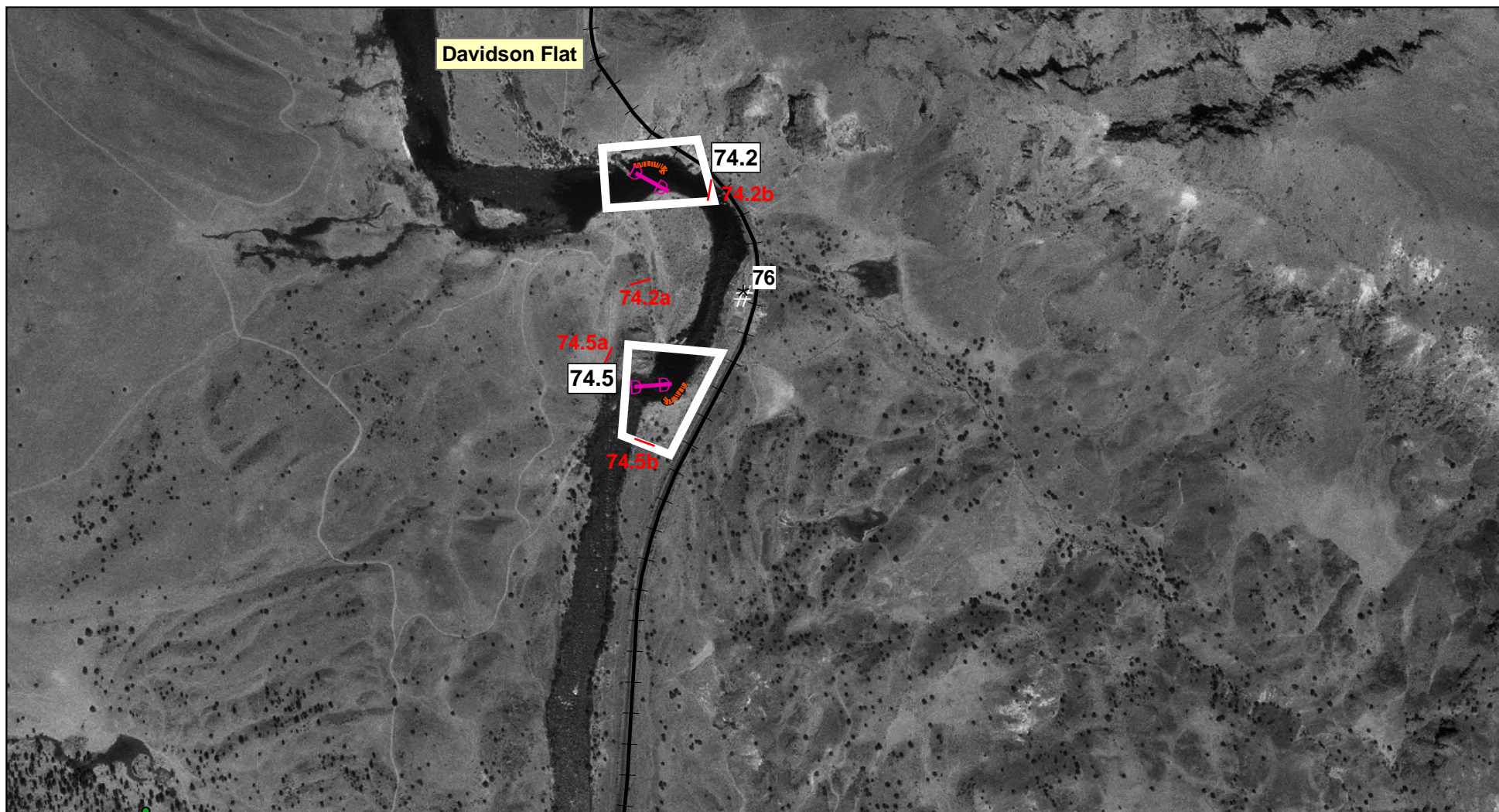
## Strategy 74.5

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |



[Link to specific strategy information](#)

[Link to previous strategy](#)

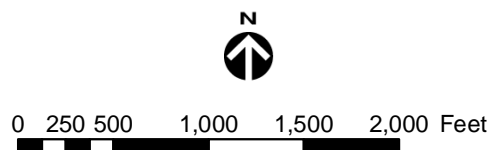
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 74.5

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-26. Strategy 74.5 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 74.5</a>	Collection	(10) 50'	Use 10 sections (50') of collection boom off of east bank	Davidson Flat	Hi-rail on railroad tracks from Maupin	Downstream habitat	RR milepost 76.1	Unverified	-121.07775, 44.96394

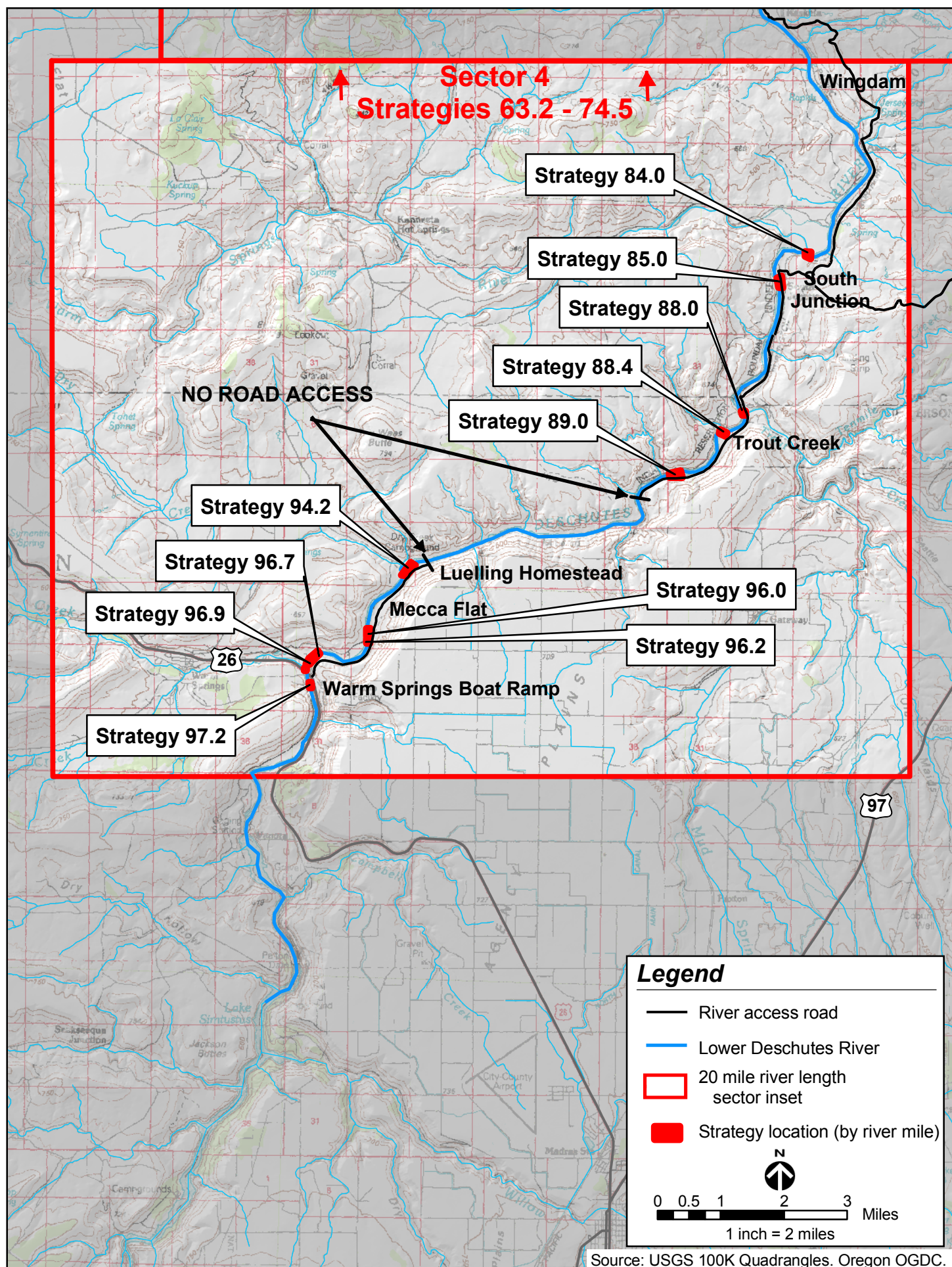


**River Mile 74.5a:** Looking east at Strategy 74.5 from west bank. Note access on east bank from railroad only.



**River Mile 74.5b:** Looking north at Strategy 74.5 from east bank. Note river access from railroad only.





**Figure 4e. Sector 5 (Strategies 84.0 - 97.2) index map of the Lower Deschutes River Geographic Response Plan.**



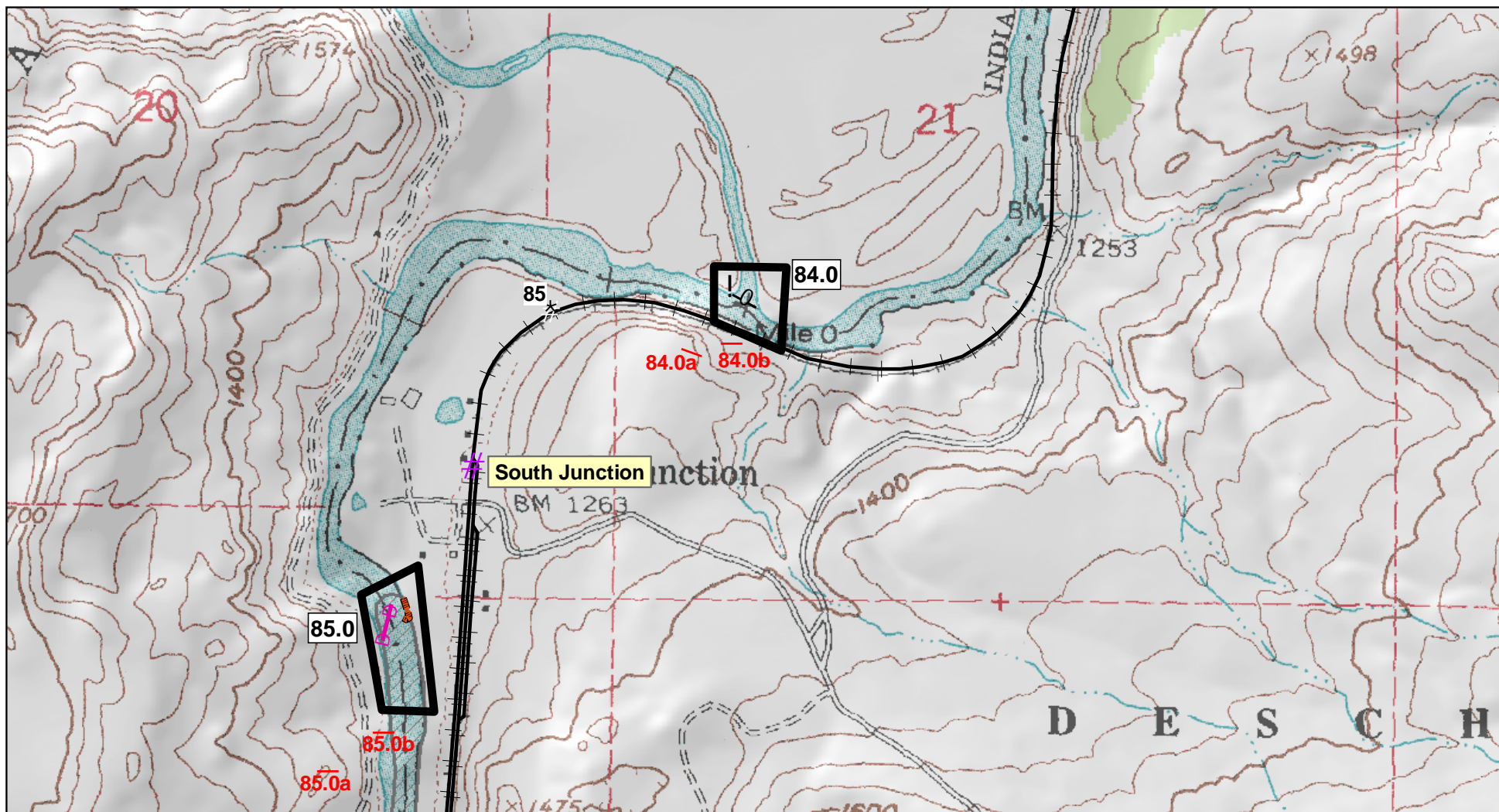
Table 4e. Strategies 84.0 through 97.2 – Booming Strategies and Resources Protected

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 84.0</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Warm Springs River	South Junction Camp	South Junction Road west from Shaniko Junction to South Junction	Warm Springs River	RR milepost 84.8 Boat access only Osprey nest nearby Strategy not necessary if Warm Springs River has sufficient flow to prevent product from traveling upstream. Notify USFWS before implementing this strategy.	Unverified	-121.06670, 44.85812
<a href="#">RM 85.0</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	South Junction Camp	South Junction Road west from Shaniko Junction to South Junction	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 85.4 Osprey nest nearby Notify USFWS before implementing this strategy.	Unverified	-121.07578, 44.85176
<a href="#">RM 88.0</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Trout Creek	Trout Creek Camp	NE Coleman Road west along Trout Creek from Hwy. 97 to Trout Creek Camp	Trout Creek, steelhead (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 87.5 Osprey nests nearby Notify USFWS before implementing this strategy.	Unverified	-121.08716, 44.82162
<a href="#">RM 88.4</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Trout Creek Camp	East bank of river dirt road south from Trout Creek approximately 0.5 miles	Downstream habitat	Osprey nests nearby	Unverified	
<a href="#">RM 89.0</a>	Deflection	(1) 400'	Use 1 section (400') to send oil into main channel and protect west island back channel	Trout Creek Camp	East bank of river, dirt road south from Trout Creek approximately 1.7 miles	Steelhead spawning (see <a href="#">Table 6-1</a> for seasonal fish presence)		Unverified	-121.10885, 44.80737
<a href="#">RM 94.2</a>	Deflection	(2) 100'	Use 2 sections (100') to send oil into main channel and protect west island back channel	Lower Mecca	East bank of river to Lower Mecca, or contact tribe to obtain access to Dry Creek Camp	Intake, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)		Unverified	-121.19490, 44.78516
<a href="#">RM 96.0</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Mecca Flat	East bank of river, dirt road north from Hwy. 26 approximately 1.5 miles to Mecca Flat	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)		Unverified	-121.20765, 44.77059
<a href="#">RM 96.2</a>	Deflection	(2) 200'	Use 2 sections (200') to send oil into main channel and protect mid-river island	Mecca Flat	East bank of river, dirt road north from Hwy. 26 approximately 1.3 miles to Mecca Flat	Island habitat		Unverified	-121.20774, 44.76868
<a href="#">RM 96.7</a>	Deflection	(24) 50'	Use 24 sections (50') to send oil into main channel and protect west river habitat	Warm Springs Lumber Mill	Warm Springs Lumber Mill	Wetlands / Intake	Osprey nest nearby	Unverified	-121.22552, 44.76461
<a href="#">RM 96.9</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Shitake Creek	Warm Springs Lumber Mill	Warm Springs Lumber Mill	Shitake Creek, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	Osprey nest nearby	Unverified	-121.22789, 44.76202

## Lower Deschutes River Geographic Response Plan

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 97.2</a>	Collection	(9) 500'	Use 9 sections (50') of collection boom off of east bank	Warm Springs Boat Ramp	Warm Springs Boat Ramp	Downstream habitat / intake, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	Osprey nest nearby	Unverified	-121.22625, 44.75840





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 84.0

Proposed Booming and Collection Strategies

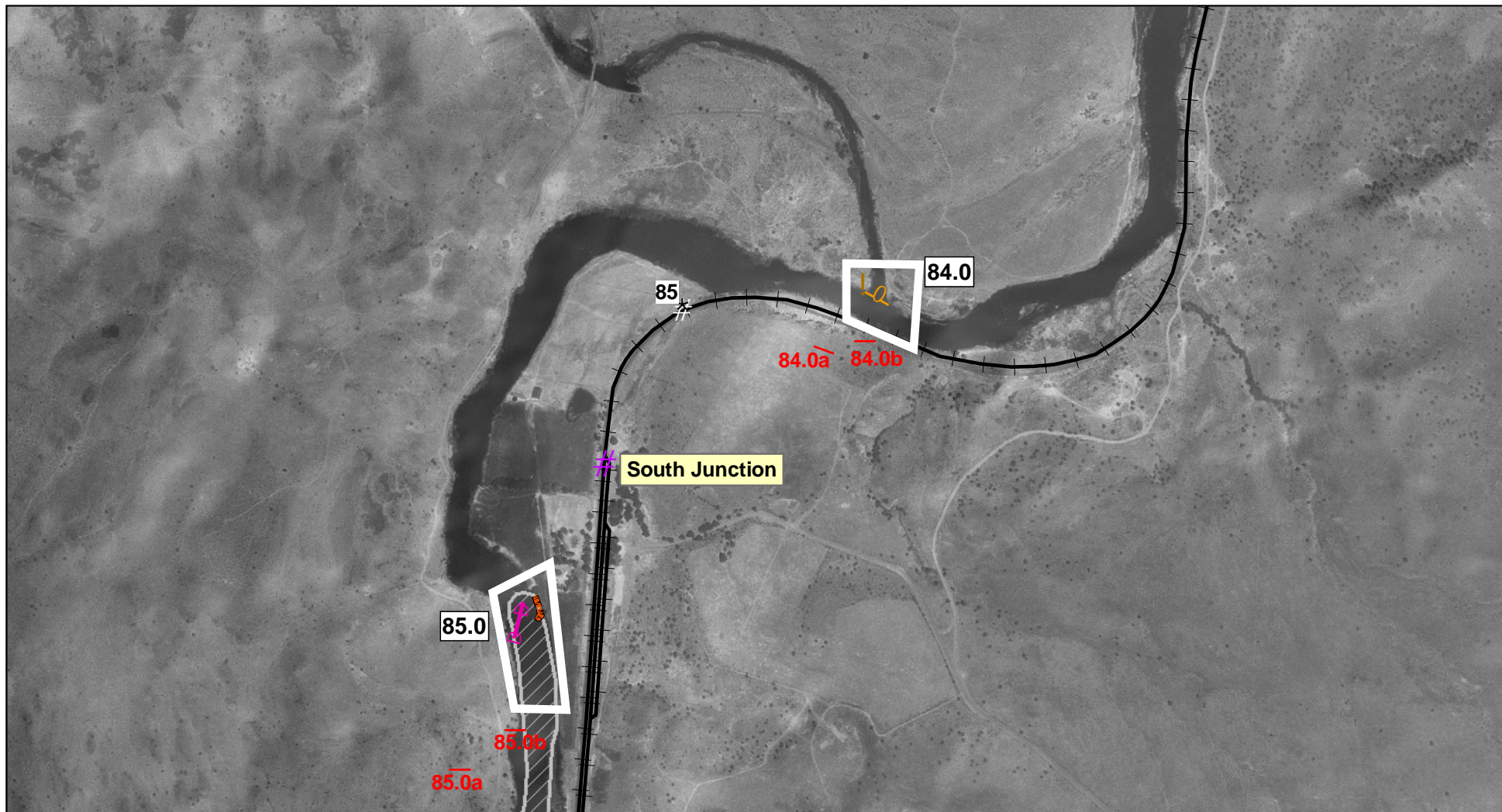
Lower Deschutes River Geographic Response Plan

0 250 500 1,000 1,500 2,000 Feet



### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |



[Link to specific strategy information](#)

[Link to previous strategy](#)

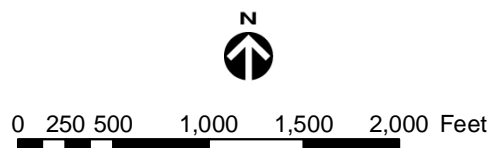
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 84.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-27. Strategy 84.0 – Booming Strategies and Resources Protected**

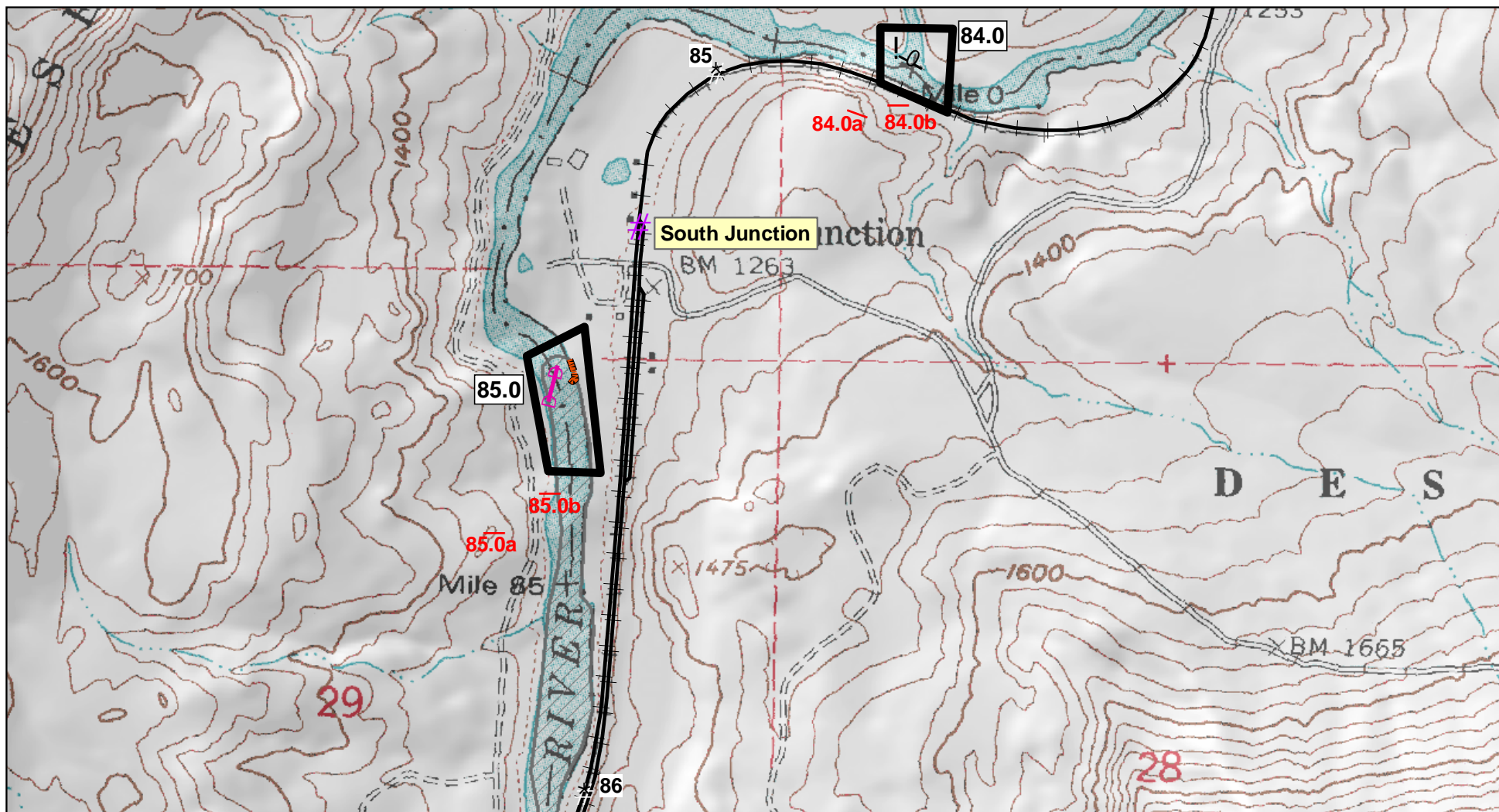
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
RM 84.0	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Warm Springs River	South Junction Camp	South Junction Road west from Shaniko Junction to South Junction	Warm Springs River	RR milepost 84.8 Boat access only Osprey nest nearby Strategy not necessary if Warm Springs River has sufficient flow to prevent product from traveling upstream. Notify USFWS before implementing this strategy.	Unverified	-121.06670, 44.85812



**River Mile 84.0a:** Looking north at Strategy 84.0. Place boom at mouth of Warm Springs River to protect upstream fish habitat. Note osprey nest on pole upstream of confluence on west bank.



**River Mile 84.0b:** Looking north at E. Deschutes confluence with Warm Springs River. Strategy not necessary if Warm Springs River has sufficient flow. Note osprey nest on pole to left.



[Link to specific strategy information](#)

[Link to previous strategy](#)

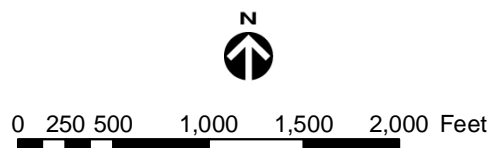
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 85.0

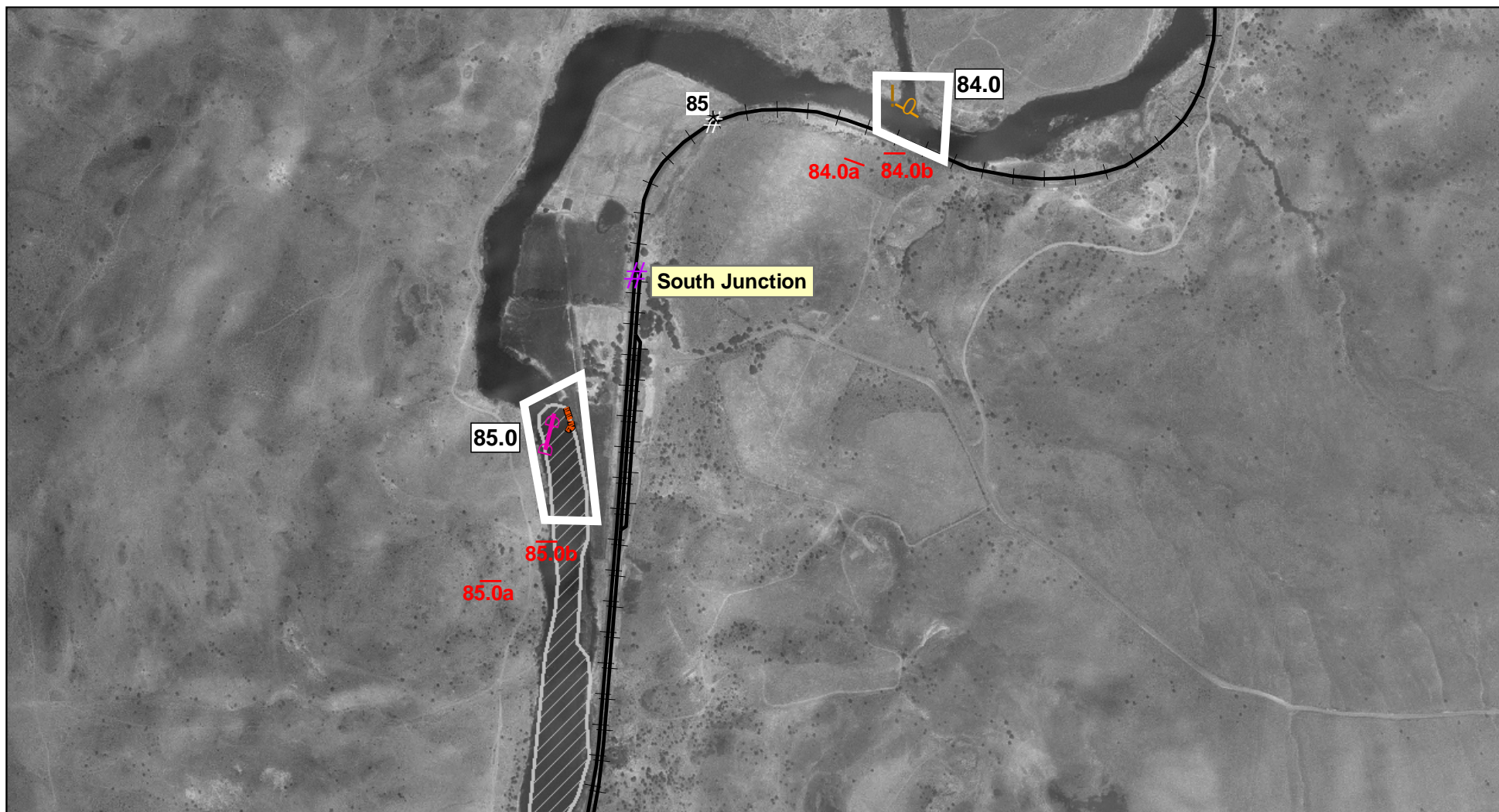
Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



Legend	
	Response strategy area
Response Objective	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed





[Link to specific strategy information](#)

[Link to previous strategy](#)

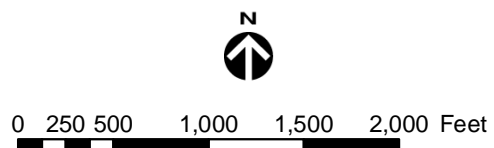
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 85.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-28. Strategy 85.0 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 85.0</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	South Junction Camp	South Junction Road west from Shaniko Junction to South Junction	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 85.4 Osprey nest nearby Notify USFWS before implementing this strategy.	Unverified	-121.07578, 44.85176

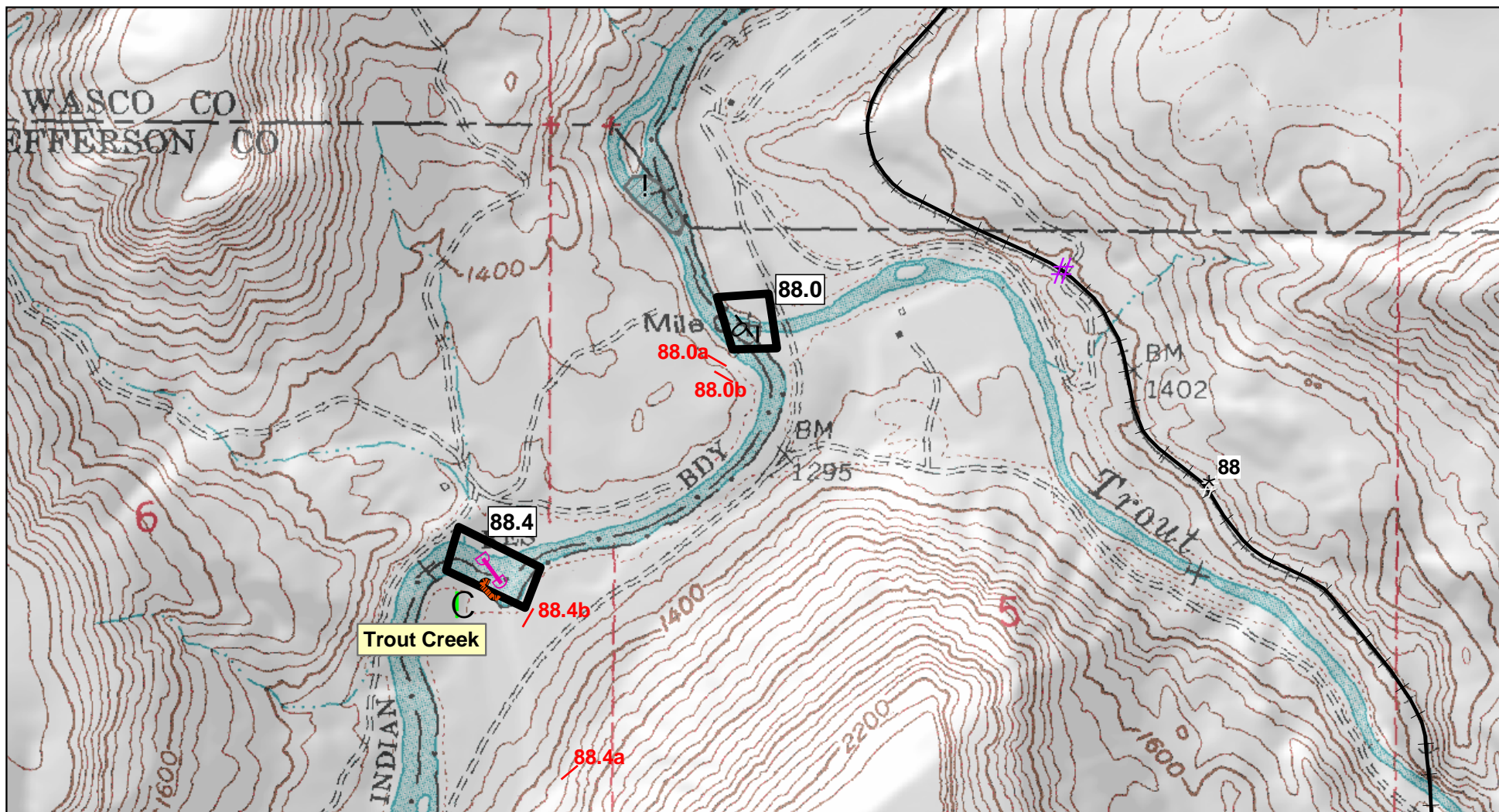


**River Mile 85.0a:** Looking northeast at Strategy 85.0. Collection should take place on east bank near building shown in middle of photograph.



**River Mile 85.0b:** Looking north at Strategy 85.0 from west bank. Collection should take place on east side near river bend.





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 88.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

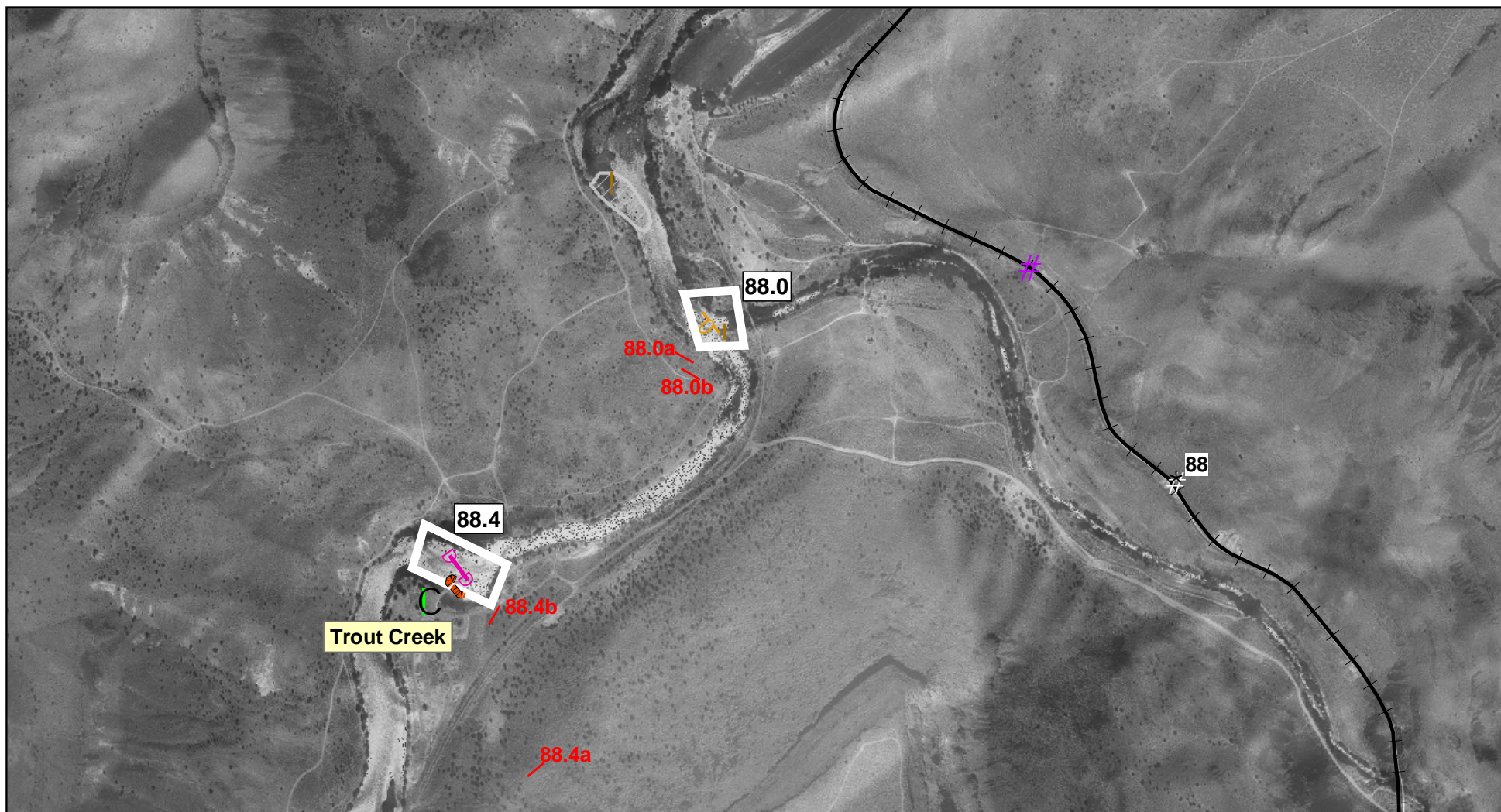
0 250 500 1,000 1,500 2,000 Feet



### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)











[Link to next strategy](#)

[Link to overview map](#)

## Strategy 88.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

<b>Legend</b>	
	Response strategy area
<b>Response Objective</b>	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed



**Table 4-29. Strategy 88.0 – Booming Strategies and Resources Protected**

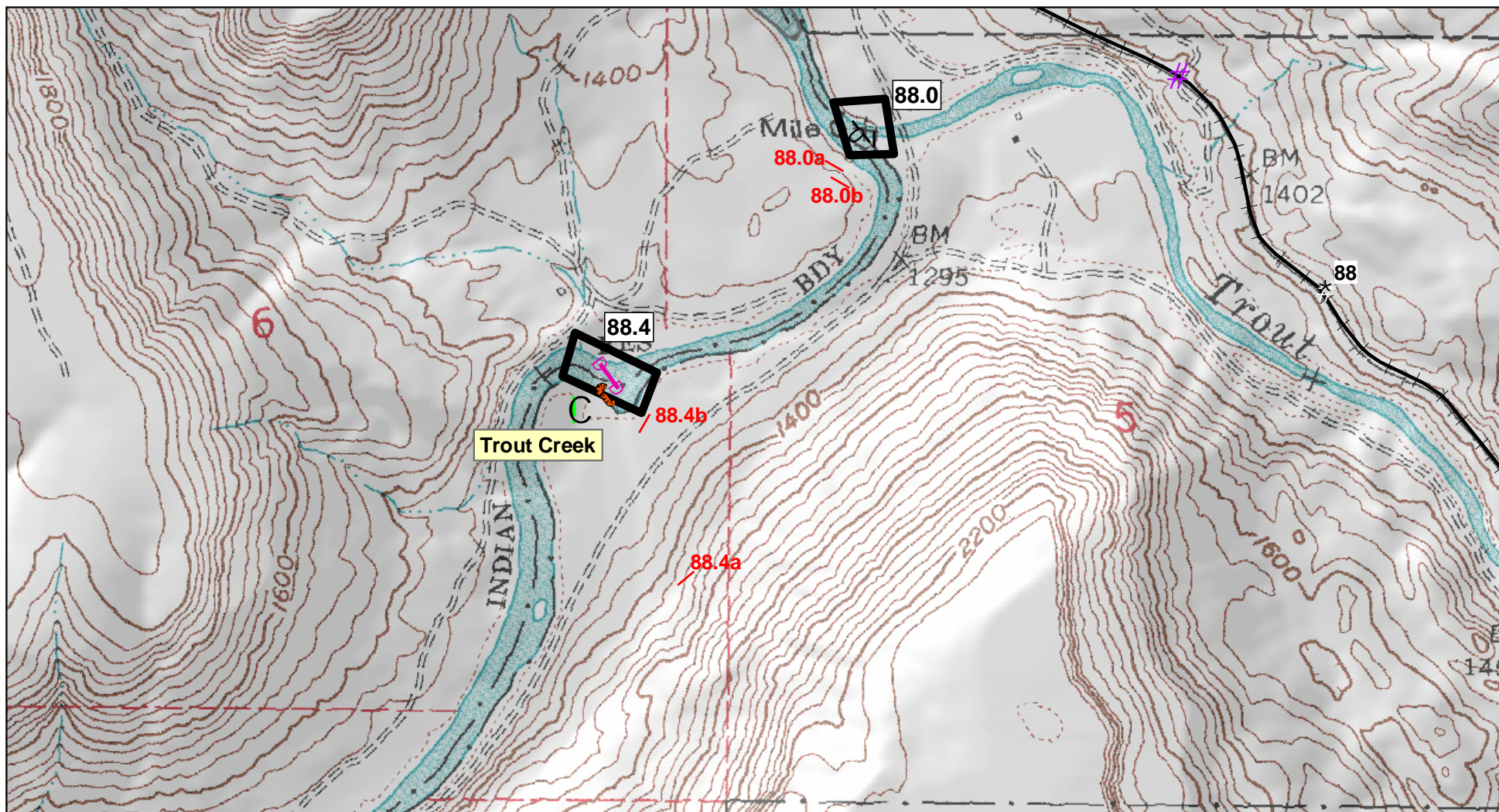
Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
RM 88.0	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Trout Creek	Trout Creek Camp	NE Coleman Road west along Trout Creek from Hwy. 97 to Trout Creek Camp	Trout Creek, steelhead (see <a href="#">Table 6-1</a> for seasonal fish presence)	RR milepost 87.5 Osprey nests nearby Notify USFWS before implementing this strategy.	Unverified	-121.08716, 44.82162



**River Mile 88.0a:** Looking east at confluence with Trout Creek. Creek should be protected from product in Deschutes due to wildlife habitat.



**River Mile 88.0b:** Looking east at Strategy 88.0. Note trees and railroad trestle that may be used to support boom.



[Link to specific strategy information](#)

[Link to previous strategy](#)

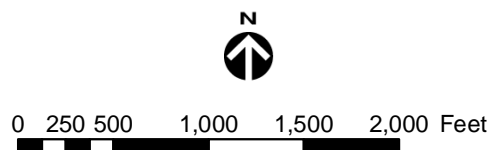
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 88.4

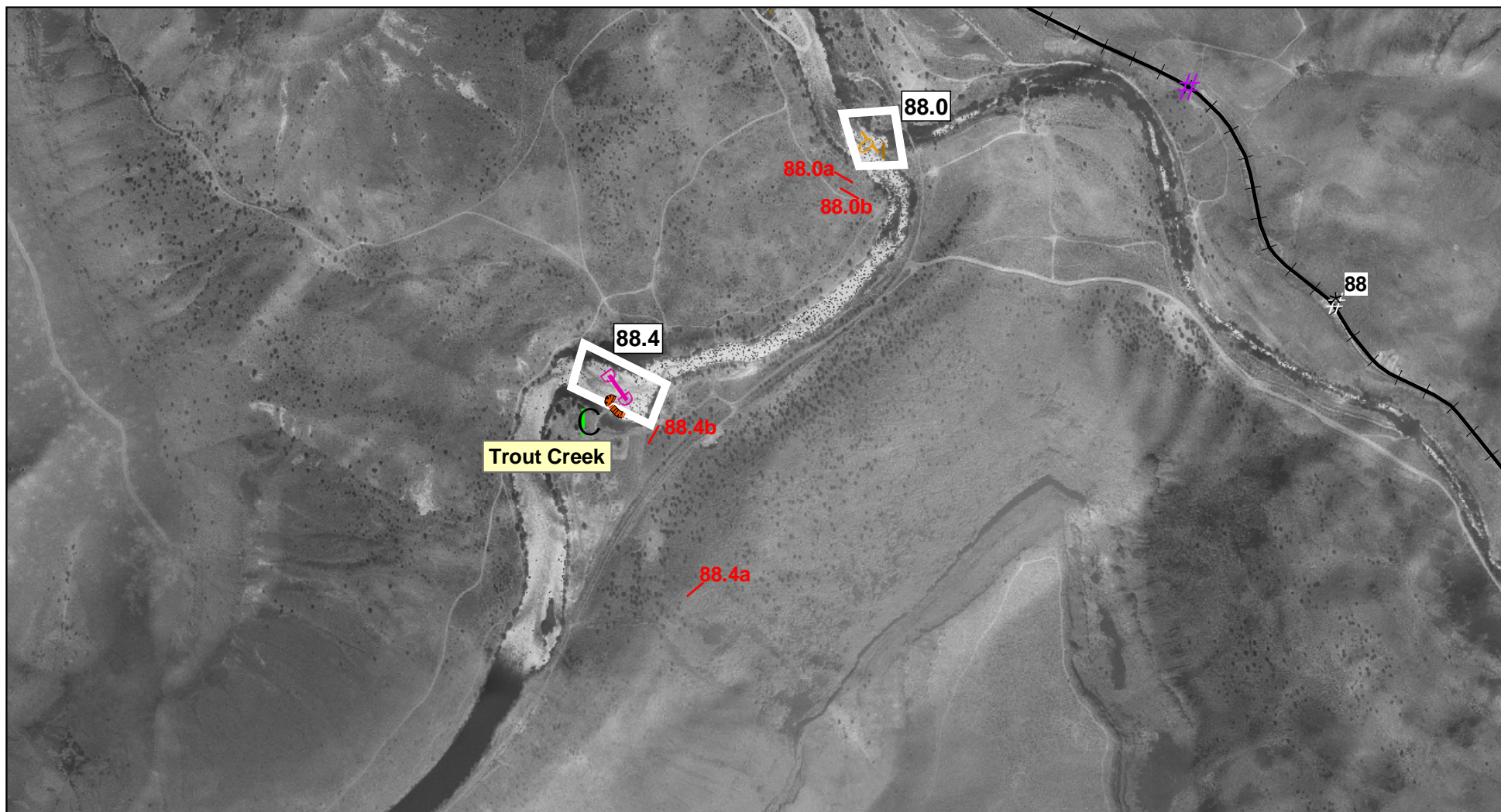
Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



Legend	
	Response strategy area
Response Objective	
	Collection
	Deflection
	Diversion
	Boat ramp
	Railroad milepost
	Photograph location and direction
	Location where roads cross railroad tracks
	2001 Osprey nest sighting (approximate location)
	Salmon spawning bed





[Link to specific strategy information](#)

[Link to previous strategy](#)

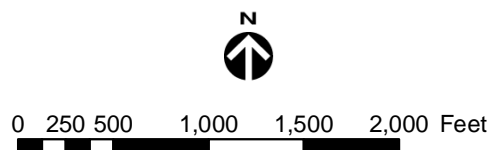
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 88.4

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-30. Strategy 88.4 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 88.4</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Trout Creek Camp	East bank of river dirt road south from Trout Creek approximately 0.5 miles	Downstream habitat	Osprey nests nearby	Unverified	

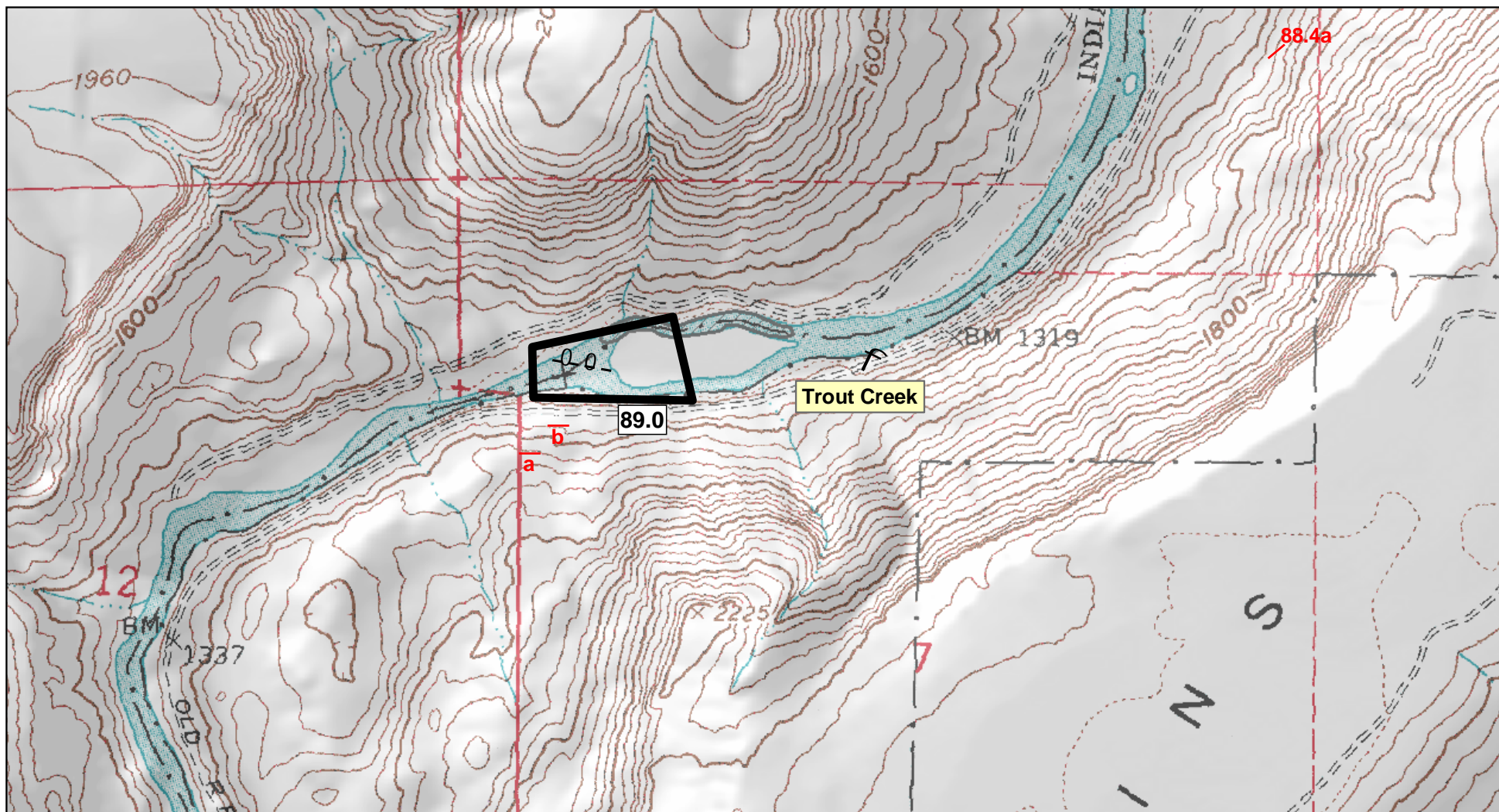


**River Mile 88.4a:** Looking west at Trout Creek staging area and Strategy 88.4.



**River Mile 88.4b:** Looking west at eddy where product should be collected. Site has good road and boat access.





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategy 89.0

Proposed Booming and Collection Strategies

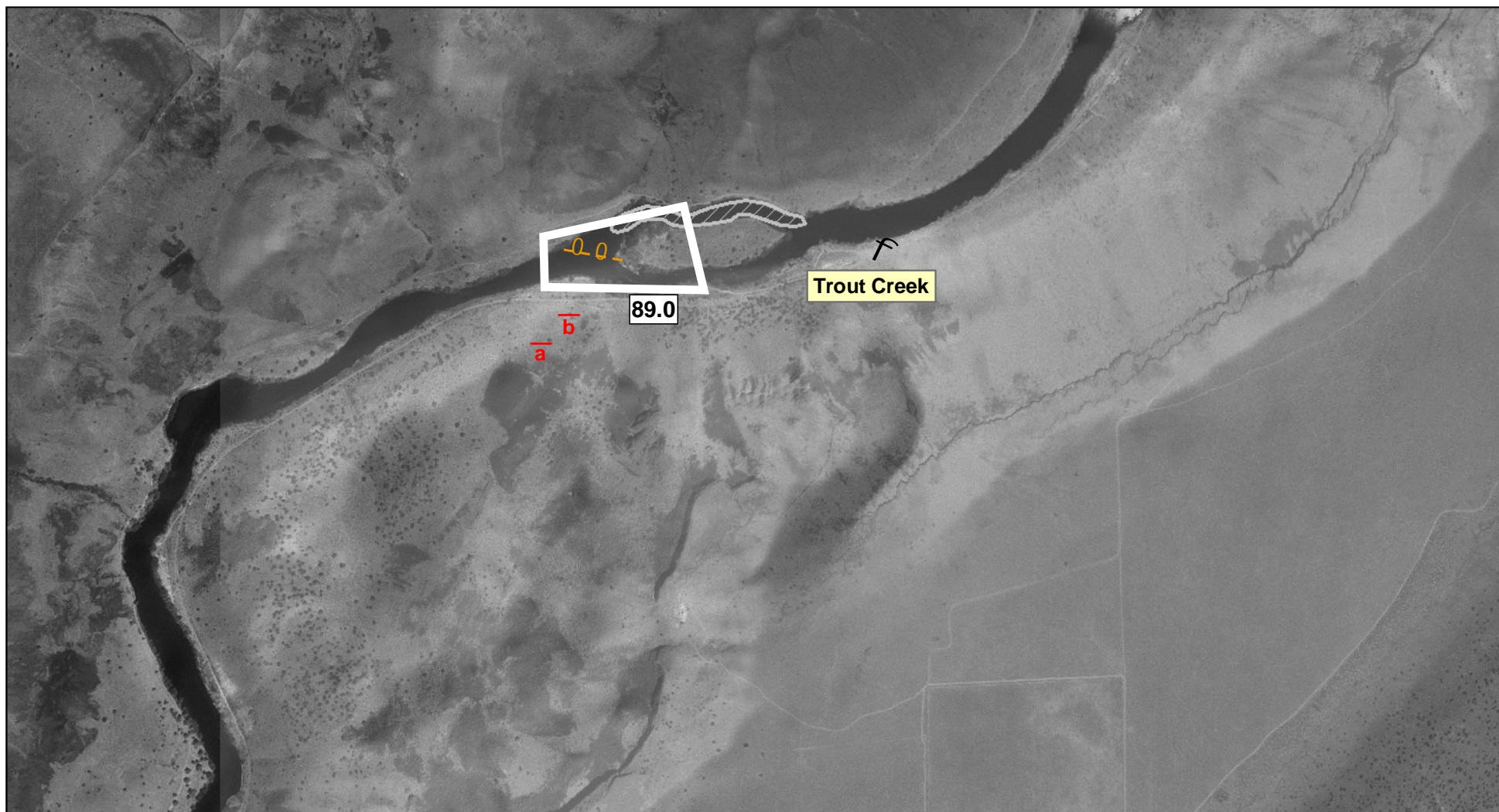
Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



0 250 500 1,000 1,500 2,000 Feet



[Link to specific strategy information](#)

[Link to previous strategy](#)

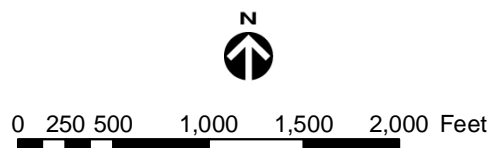
[Link to next strategy](#)

[Link to overview map](#)

## Strategy 89.0

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-31. Strategy 89.0 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 89.0</a>	Deflection	(1) 400'	Use 1 section (400') to send oil into main channel and protect west island back channel	Trout Creek Camp	East bank of river, dirt road south from Trout Creek approximately 1.7 miles	Steelhead spawning (see <a href="#">Table 6-1</a> for seasonal fish presence)		Unverified	-121.10885, 44.80737



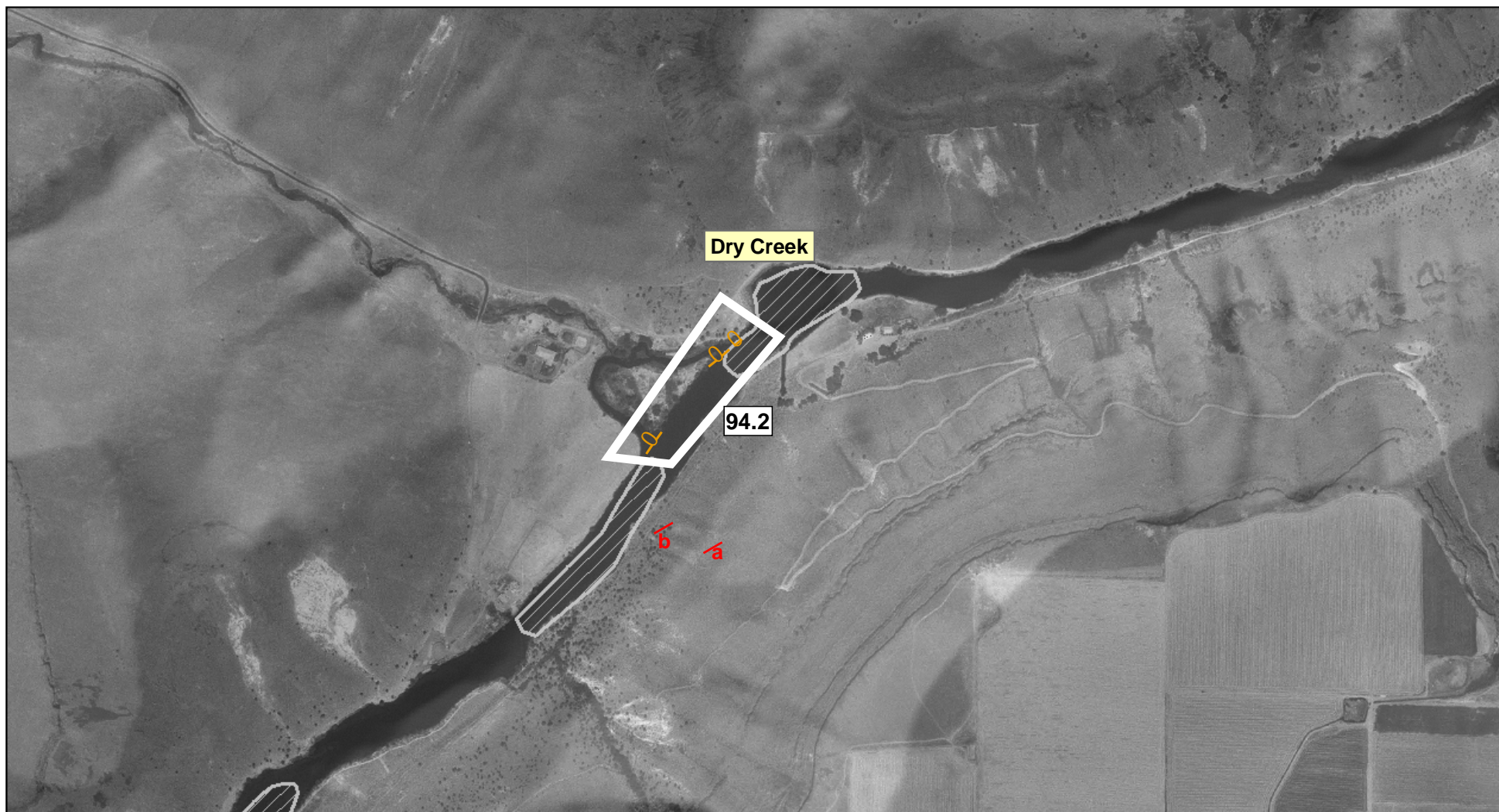
**River Mile 89.0a:** Looking northeast at location where boom should be placed to protect west side channel fish habitat. Note road access on east bank.



**River Mile 89.0b:** Looking northeast at Strategy 89.0. Direct boat access is limited. Put-in may have to take place at Trout Creek (RM 88.4).







[Link to specific strategy information](#)

[Link to previous strategy](#)

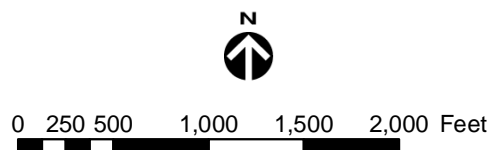
[Link to next strategy](#)

[Link to overview map](#)












## Strategy 94.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-32. Strategy 94.2 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length of Each	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 94.2</a>	Deflection	(2) 100'	Use 2 sections (100') to send oil into main channel and protect west island back channel.	Lower Mecca	East bank of river to Lower Mecca, or contact tribe to obtain access to Dry Creek Camp	Intake, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)		Unverified	-121.19490, 44.78516

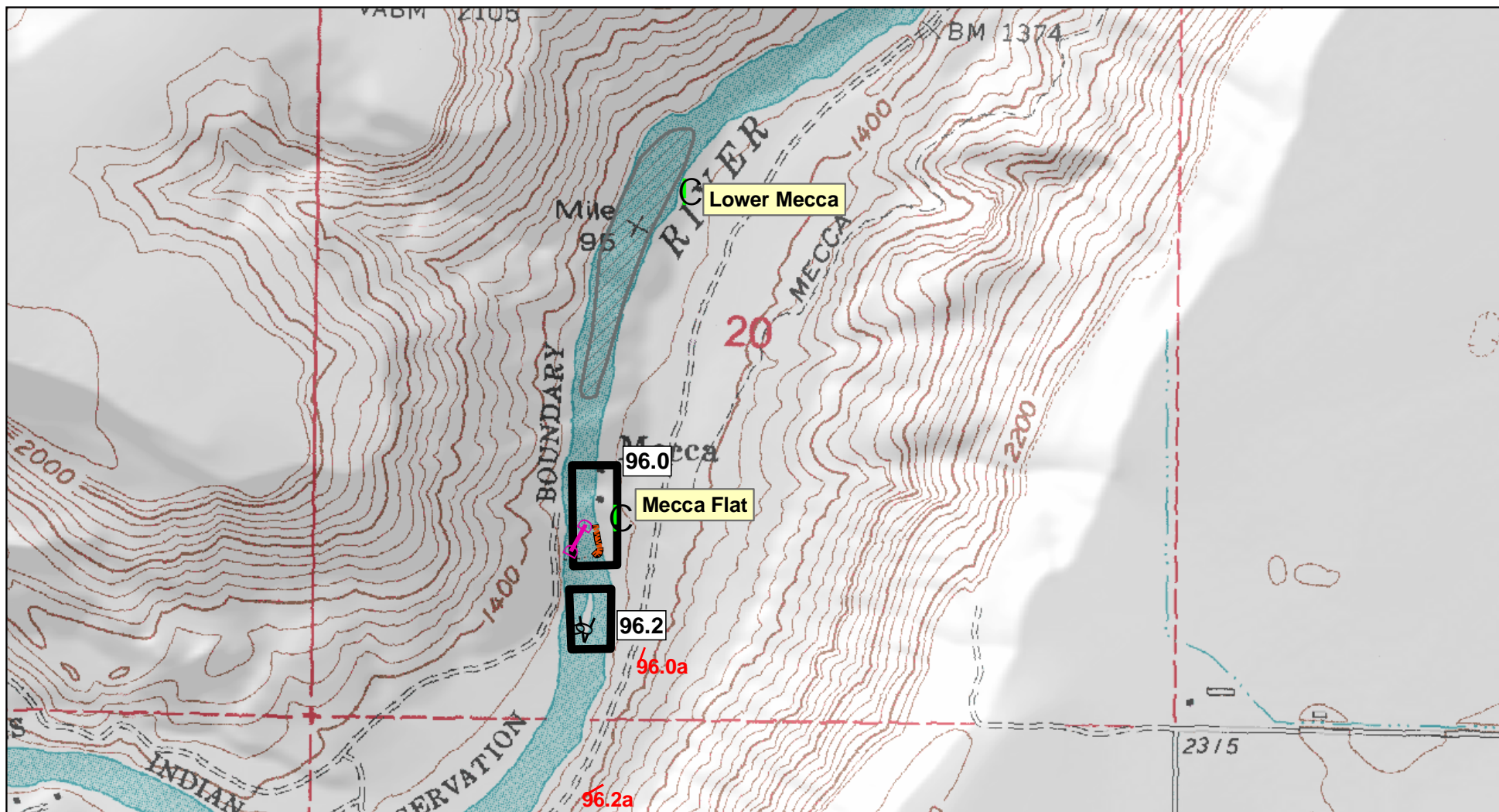


**River Mile 94.2a:** Looking northwest from east bank at west side back channel to be protected.



**River Mile 94.2b:** Looking northwest at Strategy 94.2.





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

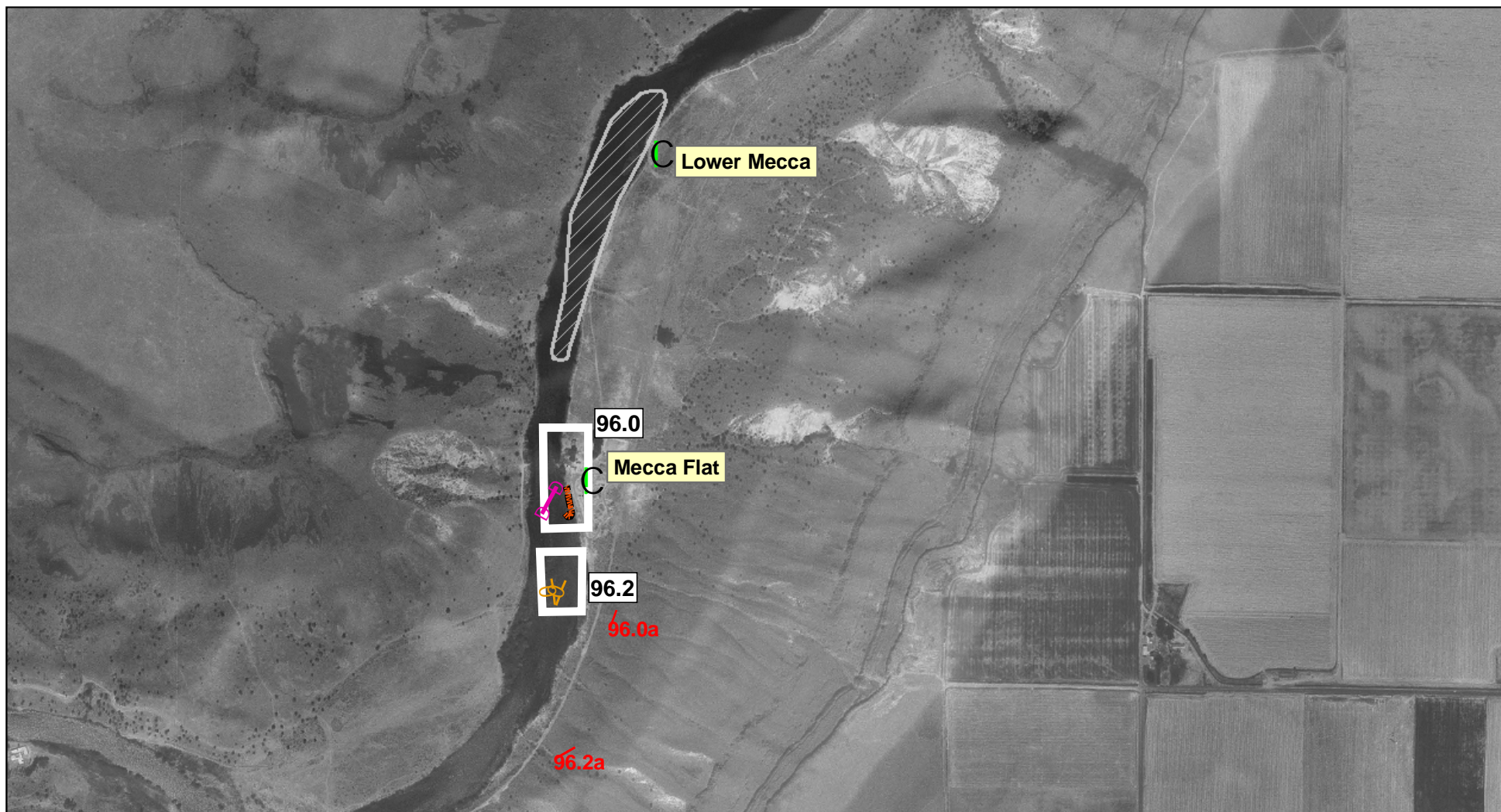
## Strategies 96.0 and 96.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |



[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategies 96.0 and 96.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed



**Table 4-33. Strategies 96.0 and 96.2 – Booming Strategies and Resources Protected**

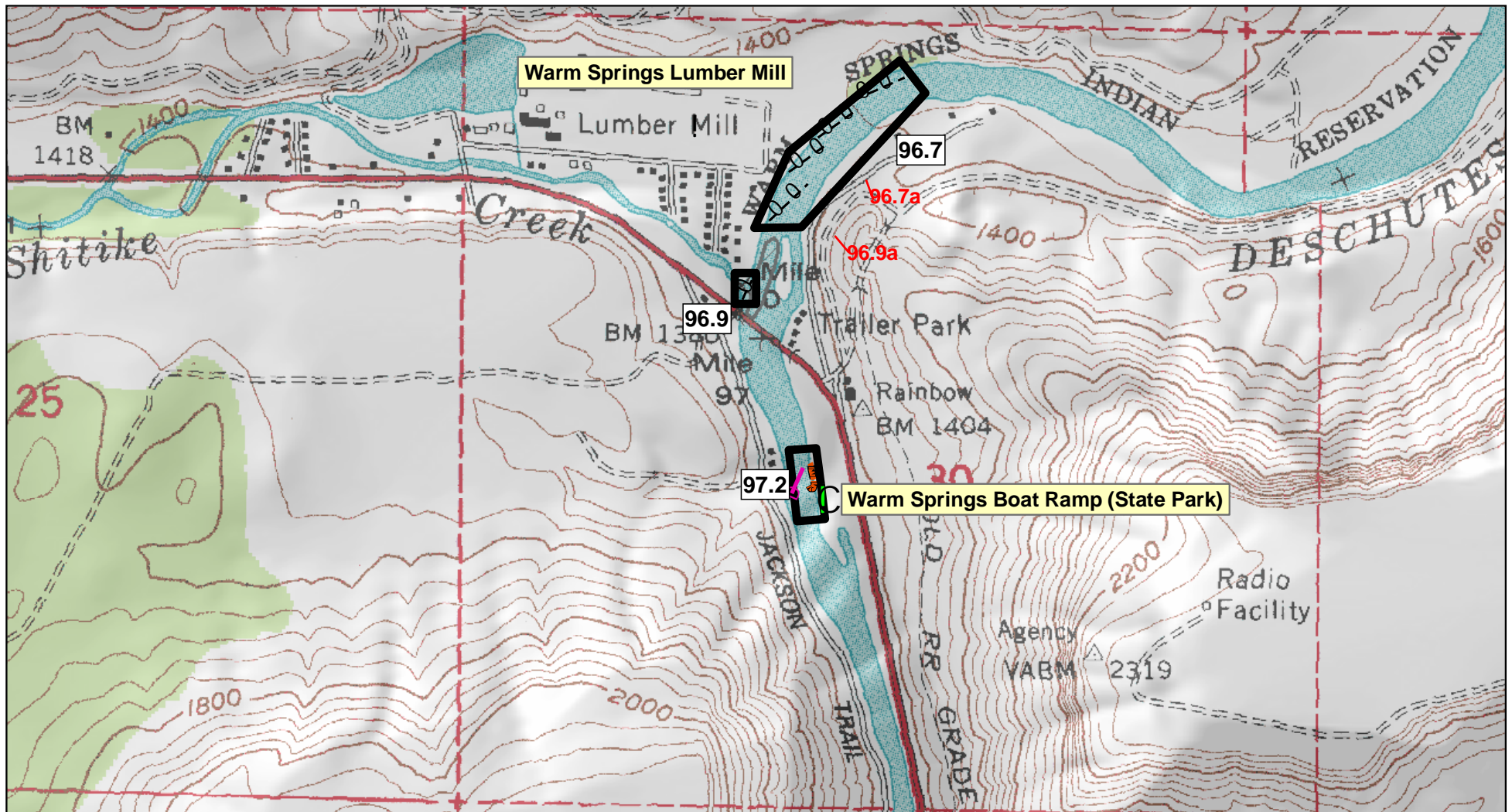
Strategy Number	Response Strategy	Number of Booms and Length	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 96.0</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Mecca Flat	East bank of river, dirt road north from Hwy. 26 approximately 1.5 miles to Mecca Flat	Downstream habitat, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)		Unverified	-121.20765, 44.77059
<a href="#">RM 96.2</a>	Deflection	(2) 200'	Use 2 sections (200') to send oil into main channel and protect mid-river island	Mecca Flat	East bank of river, dirt road north from Hwy. 26 approximately 1.3 miles to Mecca Flat	Island habitat		Unverified	-121.20774, 44.76868



**River Mile 96.0a:** Looking northwest towards Strategy 96.0 seen offshore of Mecca Flat parking area.



**River Mile 96.0b:** Looking northwest at island to be protected. Mecca Flat can be seen in back right. Note east side dirt access road.



[Link to specific strategy information](#)

[Link to previous strategy](#)

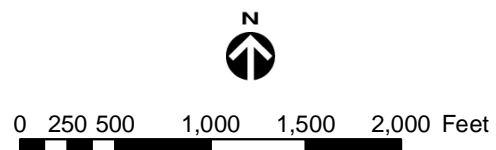
[Link to next strategy](#)

[Link to overview map](#)

## Strategies 96.7, 96.9, and 97.2

Proposed Booming and Collection Strategies

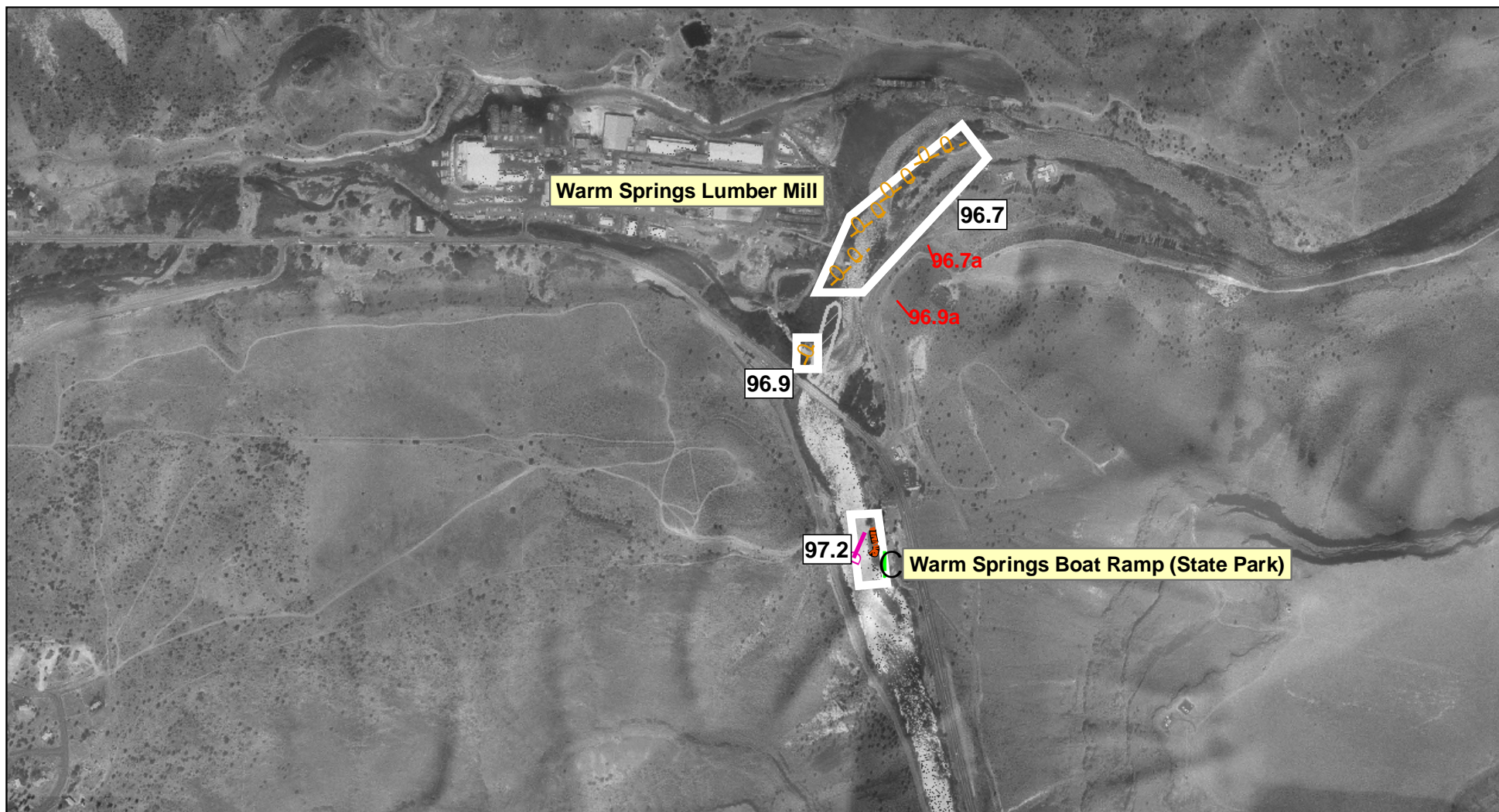
Lower Deschutes River Geographic Response Plan



### Legend

- |                           |  |
|---------------------------|--|
| Response strategy area    | Boat ramp  |
| <b>Response Objective</b> | Railroad milepost                                |
| Collection                | Photograph location and direction                |
| Deflection                | Location where roads cross railroad tracks       |
| Diversion                 | 2001 Osprey nest sighting (approximate location) |
|                           | Salmon spawning bed                              |





[Link to specific strategy information](#)

[Link to previous strategy](#)

[Link to next strategy](#)

[Link to overview map](#)

## Strategies 96.7, 96.9, and 97.2

Proposed Booming and Collection Strategies

Lower Deschutes River Geographic Response Plan

0 250 500 1,000 1,500 2,000 Feet



### Legend

	Response strategy area		Boat ramp
	Response Objective		Railroad milepost
	Collection		Photograph location and direction
	Deflection		Location where roads cross railroad tracks
	Diversion		2001 Osprey nest sighting (approximate location)
			Salmon spawning bed

**Table 4-34. Strategies 96.7, 96.9, and 97.2 – Booming Strategies and Resources Protected**

Strategy Number	Response Strategy	Number of Booms and Length	Strategy Implementation	Staging Area	Site Access	Resources Protected	Comments	Status	Lat/Long (NAD27)
<a href="#">RM 96.7</a>	Deflection	(24) 50'	Use 24 sections (50') to send oil into main channel and protect west river habitat.	Warm Springs Lumber Mill	Warm Springs Lumber Mill	Wetlands / Intake	Osprey nest nearby	Unverified	-121.22552, 44.76461
<a href="#">RM 96.9</a>	Deflection	(1) 200'	Use 1 section (200') to send oil into main channel and protect Shitake Creek.	Warm Springs Lumber Mill	Warm Springs Lumber Mill	Shitake Creek, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	Osprey nest nearby	Unverified	-121.22789, 44.76202
<a href="#">RM 97.2</a>	Collection	(9) 50'	Use 9 sections (50') of collection boom off of east bank	Warm Springs Boat Ramp	Warm Springs Boat Ramp	Downstream habitat / intake, salmon spawning beds (see <a href="#">Table 6-1</a> for seasonal fish presence)	Osprey nest nearby	Unverified	-121.22625, 44.75840



**River Mile 96.7:** Looking southwest at Strategy 96.7. Note east side road access.



**River Mile 96.9:** Looking southwest at Strategy 96.9 to protect Shitake Creek. Creek can be seen at end of bridge.



### 4.3 Protection/Collection Priorities for Deschutes River Scenarios

Due to the difficulty of collection on the Deschutes River, and the current lack of exercises testing strategies, responders should use the following table as a guide for action.

#### Procedures:

**Table 4-35. Oil moving downstream.**

Priority	Strategy	Comments
1	Strategy 0.4	Implement strategy at mouth of river to protect Columbia River.
2	Strategy 51.8	If accident is upstream of the City of Maupin, implement strategy at Maupin City Park.
3	Control source of contaminant	Mobilize response to control the source of product.
4	Work upstream from mouth to source	As resources become available, implement strategies from mouth of river and then upstream towards source.

Refer to Strategy Tables and Maps for exact locations of strategies ([Section 4.2](#)).

## **5. Shoreline Countermeasures**

Note: At this time, shoreline type mapping has not been completed on the lower Deschutes River. Until such an effort is undertaken, a series of photographs showing example shoreline types is included. These shoreline types can be matched with the shoreline countermeasures matrix to determine appropriate cleanup response.

### **5.1 Chapter Overview**

The following text and photos are in draft form, and are intended to serve as a training tool for countermeasure contingency planning and implementation for shoreline areas in federal Region 10. Shoreline countermeasure processes evolve to reflect increasingly efficient treatment techniques. Accordingly, the following information will be altered as new information is added.

### **5.2 Shoreline Type Photos**

Because shoreline type mapping has not been completed for this portion of the Deschutes River, photos of five typical shoreline types and their associated code are shown on pages 5-2 through 5-4. A full list of shoreline types is provided in [Section 5.3.1](#).

### **5.3 Oil Countermeasure Matrix**

Shoreline countermeasures following an oil spill are a critical element in determining the ultimate environmental impact and cost resulting from a spill. Local response organizations and agencies have developed mechanisms for identifying shorelines requiring treatment, establishing treatment priorities, monitoring the effectiveness and impacts of treatment, and for resolving problems as the treatment progresses.

The Northwest Area Committee has developed a manual and a series of matrices as tools for shoreline countermeasure response. The shoreline countermeasures matrices and manual will be included as a technical appendix to the Northwest Area Contingency Plan.

Each section of the manual has been adapted to the specific environments, priorities, and treatment methods appropriate to the planning area. These elements provide the information needed to select cleanup methods for specific combinations of shoreline and oil types. Local information on shoreline types (discussed in Chapter 2 of the Northwest Area Contingency Plan) can be obtained from Environmental Sensitivity Index (ESI) atlases prepared by NOAA for northern and southern Puget Sound, the Washington and Oregon coast, and the Columbia River.

The NW Area Contingency Plan can be obtained from the internet at [http://www.rrt10nwac.com/nwacp\\_document.htm](http://www.rrt10nwac.com/nwacp_document.htm).





**Shoreline Type 1:** Exposed rock shores and vertical, hard man-made structures.



**Shoreline Type 3:** Fine to medium grained sand beaches and steep unvegetated river banks.



**Shoreline Type 6B:** Gravel beaches – cobbles to boulders.





**Shoreline Type 9B:** Sheltered vegetated low bank.



**Shoreline Type 9B:** Sheltered vegetated low bank.



**Shoreline Type 9B:** Sheltered vegetated low bank.





**Shoreline Type 9B:** Sheltered vegetated low bank.



**Shoreline Type 10:** Marshes.



**Shoreline Type 10:** Marshes.

### 5.3.1 Shoreline Countermeasures Matrices

**Table 5-1. Very Light Oil (Jet fuels, Gasoline)**

- Highly volatile (should all evaporate within 1-2 days).
- High concentration of toxic (soluble) compounds.
- Result: Localized, severe impacts to water column and shoreline resources.
- Duration of impact is a function of the resource recovery rate.
- No dispersion necessary.

#### SHORELINE TYPES CODES

1 - Exposed rock shores and vertical, hard man-made structure	6C - Exposed rip rap
2 - Exposed wave-cut platforms	7 - Exposed tidal flat
3 - Fine to medium grained sand beaches and steep unvegetated river banks	8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g., docks, bulkheads)
4 - Course grained sand beaches	8B - Sheltered rubble slope
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material	9A - Sheltered sand and mud flats
6A - Gravel beaches - pebbles to cobble	9B - Sheltered vegetated low bank
6B - Gravel beaches - cobbles to boulders	10 - Marshes

#### SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
<b>CONVENTIONAL METHODS</b>														
No action	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Manual removal of oil														
Passive collection of oil			C	C	C	C	C	C						
Oiled debris removal	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal														
Ambient water flooding (deluge)														C
Ambient water flush <50 psi														
Ambient water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil														
Sediment reworking			C	C	C	C								
Sediment Removal - cleaning - replacement														
Cutting oiled vegetation														
<b>ALTERNATIVE METHODS*</b>														
In-situ burning on shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement														
Microbial addition														

**R** Recommend - May be Preferred Alternative

**C** Conditional (Refer to NW Shoreline Countermeasures Manual)

Shaded areas are Not Applicable or Not Generally Recommended

\* Follow approved process defined in National Contingency Plan (NCP) and NW Area Contingency Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual in the NW Area Contingency Plan plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.



**Table 5-2. Light Oil (Diesel, No 2 Fuel Oils, Light Crudes)**

- Moderately volatile; will leave residue (up to 1/3 of spilled amount).
- Moderate concentrations of toxic (soluble) compounds.
- Long-term contamination of intertidal resources possible.
- Potential for subtidal impacts (dissolution, mixing, sorption onto suspended sediments).
- No dispersion necessary.
- Cleanup can be very effective.

**SHORELINE TYPES CODES**

1 - Exposed rock shores and vertical, hard man-made structure	6C - Exposed rip rap
2 - Exposed wave-cut platforms	7 - Exposed tidal flat
3 - Fine to medium grained sand beaches and steep unvegetated river banks	8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g., docks, bulkheads)
4 - Course grained sand beaches	8B - Sheltered rubble slope
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material	9A - Sheltered sand and mud flats
6A - Gravel beaches - pebbles to cobble	9B - Sheltered vegetated low bank
6B - Gravel beaches - cobbles to boulders	10 - Marshes

**SHORELINE TYPES**

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	R	R	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil			C	C	C	C	C	C		R	R		C	
Passive collection of oil	C	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	C	R	R	R	R	R	R	C	R	R	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C								
Ambient water flooding (deluge)			C	C	C	R	R	R			C			C
Ambient water flush <50 psi		C			C	C	C	C		R	C			C
Ambient water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil							C	C						C
Sediment reworking			C	C	C	C								
Sediment Removal - cleaning - replacement			C	C	C									
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

**R** Recommend - May be Preferred Alternative

**C** Conditional (Refer to NW Shoreline Countermeasures Manual)

Shaded areas are Not Applicable or Not Generally Recommended

\* Follow approved process defined in National Contingency Plan (NCP) and NW Area Contingency Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual in the NW Area Contingency Plan plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

**Table 5-3. Medium Oil (Most Crude Oils & Some Heavily Weathered Light Crudes)**

- About 1/3 will evaporate within 24 hours.
- Maximum water-soluble fraction is 10-100ppm.
- Oil contamination of intertidal areas can be severe and long-term.
- Impact to waterfowl and fur-bearing mammals can be severe.
- Chemical dispersion is an option within 1-2 days.
- Cleanup most effective if conducted quickly.

**SHORELINE TYPES CODES**

1 - Exposed rock shores and vertical, hard man-made structure	6C - Exposed rip rap
2 - Exposed wave-cut platforms	7 - Exposed tidal flat
3 - Fine to medium grained sand beaches and steep unvegetated river banks	8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g., docks, bulkheads)
4 - Course grained sand beaches	8B - Sheltered rubble slope
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material	9A - Sheltered sand and mud flats
6A - Gravel beaches - pebbles to cobble	9B - Sheltered vegetated low bank
6B - Gravel beaches - cobbles to boulders	10 - Marshes

**SHORELINE TYPES**

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	R	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C							C	
Ambient water flooding (deluge)			C	C	C	R	R	R		R	R		C	C
Ambient water flush <50 psi	C	C			C	R	C	R		R	R		C	C
Ambient water flush <100 psi	C	C					C	C		C				
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	R	R		C	R	R		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal - cleaning - replacement			C	C	C	C		C			C			
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement			C	C	C	C	C	C			C			C
Microbial addition														

**R** Recommend - May be Preferred Alternative

**C** Conditional (Refer to NW Shoreline Countermeasures Manual)

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**Table 5-4. Crude Oils, Intermediate Fuel Oils, Bunker C & Heavily Weathered Medium Crudes)**

- Heavy oils with little or no evaporation or dissolution.
- Water-soluble fraction likely to be <10ppm.
- Heavy contamination of intertidal areas likely.
- Severe impacts to waterfowl and fur-bearing mammals (coating and ingestion).
- Long-term contamination to sediments possible.
- Weathers very slowly.
- Dispersion seldom effective.
- Shoreline cleanup difficult under all conditions.

**SHORELINE TYPES CODES**

1 - Exposed rock shores and vertical, hard man-made structure	6C - Exposed rip rap
2 - Exposed wave-cut platforms	7 - Exposed tidal flat
3 - Fine to medium grained sand beaches and steep unvegetated river banks	8A - Sheltered vertical rock shores and vertical, hard man-made structures (e.g., docks, bulkheads)
4 - Course grained sand beaches	8B - Sheltered rubble slope
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material	9A - Sheltered sand and mud flats
6A - Gravel beaches - pebbles to cobble	9B - Sheltered vegetated low bank
6B - Gravel beaches - cobbles to boulders	10 - Marshes

**SHORELINE TYPES**

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C		C					C	
Ambient water flooding (deluge)			C	C	C	R	R	R		R	R		C	C
Ambient water flush <50 psi	C	C			C	R	C	R		C	C		C	C
Ambient water flush <100 psi	C	C					C	C		C	C			
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	C	C	C	C	C	C		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal - cleaning - replacement			C	C	C	C		C						
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, or cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

**R** Recommend - May be Preferred Alternative**C** Conditional (Refer to NW Shoreline Countermeasures Manual)

Shaded areas are Not Applicable or Not Generally Recommended

\* Follow approved process defined in National Contingency Plan (NCP) and NW Area Contingency Plan

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## **6. Sensitive Resource/Wildlife Flight Restriction Information**

The lower Deschutes River subbasin affords a wide variety of aquatic, riparian and upland habitats. These varied habitats support a complex diversity of wildlife species, including large and small mammals, passerine birds, raptors, upland birds, waterfowl and wading birds, reptiles and amphibians. Some species are resident throughout the year; others are migratory either within the subbasin or, in many cases, seasonally migrate outside the subbasin. The status of the several hundred species of wildlife that use the subbasin varies widely, some being very abundant and others less abundant. Populations of certain species are very tenuous and their future presence in the subbasin will require improved information and decisive management actions. Many wildlife species found in the subbasin are classified as threatened, endangered, sensitive, or of special concern under the federal Endangered Species Act or under Oregon Administrative Rules.

### **6.1 Fish**

The completion of both the Pelton Reregulating Dam in 1958 and Round Butte Dam in 1964 effectively eliminated the production of anadromous fish in the upper Deschutes subbasin. Passage of adult salmonids around the Pelton-Round Butte Project was accomplished with a 3-mile-long fishway that extended above Pelton Dam and a tramway that lifted fish over Round Butte Dam. However, downstream passage of juvenile fish through the project was found to be inadequate and attempts to continue anadromous fish production above the complex were abandoned in 1968. As a result, in 1968, Portland General Electric agreed to build and finance the operation of an anadromous fish hatchery at the base of Round Butte Dam to mitigate for losses above the project. Upcoming re-licensing of the Pelton-Round Butte Project has prompted reexamination of the feasibility of downstream and upstream fish passage.

Anadromous fish present in the lower Deschutes River include spring and fall chinook salmon, coho salmon, sockeye salmon, summer steelhead, and Pacific lamprey. [Table 6-1](#) provides a summary of each fish's lifecycle.

#### **6.1.1 Spring Chinook Salmon**

Spring chinook salmon historically spawned in the mainstem Deschutes River upstream of the Pelton-Round Butte Project, in Squaw Creek, The Metolius River, the Warm Springs River system and Shitike Creek. Historic use of the Crooked River by spring chinook is documented but conflicting reports exist on when this population was lost.

Wild spring chinook salmon currently spawn in the Warm Springs River system and Shitike Creek. Wild spring chinook salmon spawning in the Warm Springs system occurs primarily above Warm Springs National Hatchery (WSNFH), located at river mile 9 on the Warm Springs River. All fish passing WSNFH must enter a trap and be allowed to gain access to the spawning areas. Only wild spring chinook are allowed upstream into the spawning areas.

Spring chinook juveniles rear in the Warm Springs system or the mainstem Deschutes for approximately 18 months before migrating to the ocean. Adults typically return to the Deschutes starting in April each year after spending one to three years in the ocean. Typical of the five species of Pacific salmon, spring chinook all die after reaching sexual maturity and spawning.

Spring chinook contribute to significant Deschutes River sport and tribal fisheries, primarily in the reach downstream from Sherars Falls. Annual returns of spring chinook to the Deschutes are impacted by Columbia River mainstem fisheries and passage losses through Bonneville and The Dalles dams and reservoirs. Columbia River mainstem harvest rates have been greatly reduced since 1975 to protect weak upriver stocks and have been maintained at low levels through Endangered Species Act constraints on the mainstem fishery impacts to Snake River populations

Management of spring chinook in the Deschutes River is guided by the need to escape a minimum of 1,300 wild adult spring chinook upstream of the barrier dam at WSNFH. Adult recruitment to the spawning grounds has been at or above replacement for a majority of the years of record, suggesting a relatively stable population.

#### **6.1.2 Fall Chinook Salmon**

Fall chinook salmon are indigenous to the Deschutes River subbasin and currently spawn in the mainstem lower Deschutes River from the mouth upstream to the Pelton Reregulating Dam at river mile 100. Redd counts and population estimate calculations suggest that from 1988 to present, a change in spawning distribution may have occurred and a larger percentage of



**Table 6.1. Life cycles of selected fish species in the Lower Deschutes River**

<b>Fish Species/ Month</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>December</b>
Spring chinook ( <i>Oncorhynchus tshawytscha</i> )	Emerge from gravel: Juveniles in system for 1 to 2 years.	Emerge from gravel: Juveniles in system for 1 to 2 years.	Emerge from gravel: Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults in the system. Juveniles in system for 1 to 2 years.	Adults in the system. Juveniles in system for 1 to 2 years.	Juveniles in system for 1 to 2 years. Eggs in gravel.	Juveniles in system for 1 to 2 years. Eggs in gravel.	Juveniles in system for 1 to 2 years. Eggs in gravel.	Juveniles in system for 1 to 2 years. Eggs in gravel.
Fall chinook ( <i>Oncorhynchus tshawytscha</i> )	Eggs in gravel. Juveniles in system for 1 to 2 years.	Eggs in gravel. Juveniles in system for 1 to 2 years.	Emerge from gravel: Juveniles in system for 1 to 2 years.	Emerge from gravel: Juveniles in system for 1 to 2 years.	Emerge from gravel: Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults in the system. Juveniles in system for 1 to 2 years.	Eggs in gravel. Juveniles in system for 1 to 2 years.	Eggs in gravel. Juveniles in system for 1 to 2 years.	Eggs in gravel. Juveniles in system for 1 to 2 years.
Coho ( <i>Oncorhynchus kisutch</i> )	Eggs in gravel. Juveniles in system for 1 to 2 years.	Eggs in gravel. Juveniles in system for 1 to 2 years.	Juveniles first emerge and are in system for 1 to 2 years.	Juveniles first emerge and are in system for 1 to 2 years.	Juveniles first emerge and are in system for 1 to 2 years.	Juveniles first emerge and are in system for 1 to 2 years.	Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults enter to spawn. Juveniles in system for 1 to 2 years.	Adults enter to spawn. Eggs in gravel.	Adults enter to spawn. Eggs in gravel. Juveniles in system for 1 to 2 years.	Adults enter to spawn. Eggs in gravel. Juveniles in system for 1 to 2 years.
Sockeye ( <i>Oncorhynchus nerka</i> )				Juveniles migrate to ocean from rearing lakes.	Juveniles migrate to ocean from rearing lakes.	Adults enter to spawn. Juveniles in system for 1 to 2 years. Juveniles migrate to ocean from rearing lakes.	Adults enter to spawn.	Adults enter to spawn.				Few returning sockeye due to hydroelectric complex. Spawning and rearing of juveniles would occur in Suttle Lake, Deschutes is only used for migration.
Summer steelhead ( <i>Oncorhynchus mykiss</i> )	Adults overwinter in system. Juveniles in the system for approximately 2 years.	Adults overwinter in system. Juveniles in the system for approximately 2 years.	Adults overwinter in system. Juveniles in the system for approximately 2 years. Eggs in gravel for approximately 4 to 7 weeks before hatching.	Adults overwinter in system. Juveniles in the system for approximately 2 years. Eggs in gravel for approximately 4 to 7 weeks before hatching.	Adults overwinter in system. Juveniles in the system for approximately 2 years. Eggs in gravel for approximately 4 to 7 weeks before hatching.	Adults overwinter in system. Juveniles in the system for approximately 2 years. Eggs in gravel for approximately 4 to 7 weeks before hatching.	Adults enter to spawn, overwinter in system. Juveniles in the system for approximately 2 years.	Adults enter to spawn, overwinter in system. Juveniles in the system for approximately 2 years.	Adults enter to spawn, overwinter in system. Juveniles in the system for approximately 2 years.	Adults enter to spawn, overwinter in system. Juveniles in the system for approximately 2 years.	Adults overwinter in system. Juveniles in the system for approximately 2 years.	Adults overwinter in system. Juveniles in the system for approximately 2 years.

Shaded areas indicate likely period that eggs can be expected in spawning areas identified in maps in Section 4.

## Lower Deschutes River Geographic Response Plan

Fish Species/ Month	January	February	March	April	May	June	July	August	September	October	November	December
Bull trout ( <i>Salvelinus confluentus</i> )	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.	Adult and juvenile life forms resident in the system year-round. Spawning occurs in tributaries.
Pacific lamprey ( <i>Lampetra tridentata</i> )	Adult and juvenile life forms resident in the system year-round.	Adult and juvenile life forms resident in the system year-round.	Adult and juvenile life forms resident in the system year-round.	Adult and juvenile life forms resident in the system year-round.	Adult and juvenile life forms resident in the system year-round.	Adult and juvenile life forms resident in the system year-round.	Adults migrate into system to spawn. Young hatch 2-3 weeks after egg laying and reside in the sediments for 4 to 6 years before emerging as adults and outmigrating to the ocean.	Adults migrate into system to spawn. Young hatch 2-3 weeks after egg laying and reside in the sediments for 4 to 6 years before emerging as adults and outmigrating to the ocean.	Adults migrate into system to spawn. Young hatch 2-3 weeks after egg laying and reside in the sediments for 4 to 6 years before emerging as adults and outmigrating to the ocean.	Adults migrate into system to spawn. Young hatch 2-3 weeks after egg laying and reside in the sediments for 4 to 6 years before emerging as adults and outmigrating to the ocean.	Adult and juvenile life forms resident in the system year-round.	Adult and juvenile life forms resident in the system year-round.

Shaded areas indicate likely period that eggs can be expected in spawning areas identified in maps in Section 4.



## Lower Deschutes River Geographic Response Plan

all fall chinook spawning is taking place downstream from Sherars Falls. This shift in spawning distribution may be partially in response to riparian and instream habitat recovery downstream from Sherars Falls.

The Deschutes River fall chinook population is presently the second largest wild fall chinook population upstream from Bonneville Dam, with the group that spawns in the Hanford Reach of the Columbia River being the only larger group. Annual returns of fall chinook to the Deschutes River are impacted by Columbia River mainstem fisheries and river impoundment passage losses through Bonneville and The Dalles reservoirs.

Fall chinook adults enter the Deschutes River starting in June each year after spending one to five years in the ocean environment. Fall chinook only spawn in the mainstem lower Deschutes River; tributary spawning is unknown for this population. Similar to spring chinook, fall chinook all die after sexual maturity and spawning. Juvenile fall chinook emerge from the gravel from March to May and spend only a short period of time in freshwater prior to starting their seaward migration in June.

Management of fall chinook is guided by estimated run to the river and escapement over Sherars Falls. Adult recruitment to the spawning grounds has been at or above replacement for a majority of the years of record and while variable, suggests a relatively stable population.

The fall chinook population in the lower Deschutes River is not supplemented with hatchery releases and is considered to be healthy.

### 6.1.3 Summer Steelhead

Summer steelhead occur throughout the mainstem lower Deschutes River below the Pelton Regulating Dam and in most tributaries below the dam. Before construction of the Pelton-Round Butte Project, summer steelhead were also found in the Deschutes River upstream to Big Falls (river mile 128), in Squaw Creek, and in the Crooked River. Historic summer steelhead distribution in the Metolius River is uncertain.

Wild summer steelhead spawn in the mainstem lower Deschutes River Warm Springs River system, Shitike, Skookum, Wapinitia, Eagle, and Nena creeks, the Trout Creek system, the Bakeoven Creek system, the Buckhollow Creek system and other small tributaries with adequate flow and a lack of barriers to fish migration.

Steelhead typically enter the Deschutes River starting in late June or early July through October each year. Adult summer steelhead in the Deschutes River typically spend one or two years in the ocean. Adults over-winter in the mainstem and enter their natal tributaries during winter high flow events. Spawning takes place from March to May, depending on location. Time of entry and spawning is typically earlier in east-side origin tributaries than the west-side tributaries of Shitike Creek and the Warm Springs system. Juveniles have a variable freshwater residence pattern with two years freshwater residency being the most common. Evidence exists to support the theory that large numbers of juveniles produced in tributaries spend a significant portion of their freshwater lives in the mainstem Deschutes making the mainstem a very important production area.

Summer steelhead contribute to significant Deschutes River sport and tribal fisheries throughout the lower Deschutes. Annual returns to the Deschutes River are impacted by Columbia River mainstem fisheries and river impoundment passage losses through Bonneville and The Dalles dams and reservoirs.

The *U.S. vs. Oregon* decision agreed upon a management objective for Deschutes River wild summer steelhead of an escapement of 6,575 adults upstream from Sherars Falls annually. Wild summer steelhead were listed as a federal threatened species in 1999.

### 6.1.4 Pacific Lamprey

Pacific lamprey are found in the lower Deschutes River, Shitike Creek, the Warm Springs River and selected tributaries. Pacific lamprey distribution and life history information has not historically been collected in the Deschutes River although a Confederated Tribes of Warm Spring Reservation of Oregon (CTWSRO) project started in 2003 to better understand life history and distribution. Abundance of Pacific lamprey in the subbasin has not been estimated but is thought to be low relative to historic levels. Pacific lamprey abundance throughout the Columbia River basin has decreased significantly in recent years and the U.S. Fish and Wildlife Service list them as a species of concern. Species of concern are those whose conservation is of concern but for which further information is still needed.

## Lower Deschutes River Geographic Response Plan

Pacific lamprey juveniles are known to spend five to seven years in freshwater and undergo several life stage changes prior to migrating to the ocean.

Lamprey are an important traditional food source for members of the CTWSRO and are harvested annually from June through August in the fish ladder and surrounding area at Sherars Falls.

### 6.1.5 Redband Trout

Redband trout, the inland variant of rainbow trout (both *Oncorhynchus mykiss*) are indigenous to the lower Deschutes River subbasin. Redband are found throughout the mainstem and tributaries.

Indigenous Deschutes River populations were supplemented with hatchery rainbow trout from 1940 to 1978 but are currently managed for wild fish only.

Redband rainbow are quite abundant in the lower Deschutes River and support a popular and well-known recreational fishery.

### 6.1.6 Bull Trout

Bull trout, formally called Dolly Varden, are indigenous to the lower Deschutes River subbasin and are found in the mainstem, the Warm Springs River and Shitike Creek.

Both fluvial and resident bull trout populations are believed to exist in the lower Deschutes River subbasin. The Shitike Creek and Warm Springs River groups are thought be fluvial; that is, residing for a portion of their life in the smaller stream before migrating into the larger mainstem Deschutes River. Resident groups may also exist in all three locations. Adult upstream migration takes place with the onset of maturity.

Bull trout are currently listed as a threatened species under the federal Endangered Species Act. The status of bull trout populations in the lower Deschutes subbasin is unknown but is believed to be small and depressed relative to the pre-European settlement condition.

### 6.1.7 Coho and Sockeye Salmon

Coho salmon are uncommon in the lower Deschutes River and may never have been indigenous. Adults observed in the lower Deschutes River in recent years are likely hatchery origin returns from other river systems that inadvertently stray into the lower Deschutes River. Both adults and their subsequent juvenile production are uncommon relative to other salmonids. Coho in the lower Deschutes River are not on either state or federal endangered species lists.

Sockeye salmon are indigenous to the Deschutes subbasin and historically migrated through the Deschutes and Metolius rivers into Lake Creek and Suttle Lake to Link Creek where they spawned. The juveniles subsequently reared in Suttle Lake. The anadromous form of sockeye could not migrate upstream past the hydroelectric complex upon its completion in the late 1960s. A few adult sockeye continue to be documented each year in the lower Deschutes River but they are presently uncommon. Reintroduction of the anadromous form of sockeye into areas upstream from the hydroelectric complex is being planned for the near future. Currently, sockeye in the lower Deschutes River are not on either state or federal endangered species lists.

## 6.2 Mammals

California bighorn sheep, native to the lower Deschutes River but extirpated by the early 20<sup>th</sup> century, were reintroduced in 1993 with the release of 35 animals on the east bank at approximately river mile 20. A second release of 18 animals was made in 1995. This reintroduction has been very successful and the current population stands at approximately 300 individuals distributed on both the east and west banks. Very limited sport harvest has been allowed since 1998.

Oregon Department of Fish and Wildlife (ODFW) biologists conduct annual herd composition and trend surveys on bighorn sheep, mule deer, Rocky Mountain elk, and pronghorn antelope on lands bordering the lower Deschutes River. These populations in the subbasin are generally stable with some annual or intra-annual variation.



## Lower Deschutes River Geographic Response Plan

Lambing bighorn sheep are seasonally sensitive to disturbance. ODFW advocates a minimum fly zone (two flights per day) from Harris Canyon (river mile 12.0) to Jones Canyon (river mile 34.3) during the period April 15 to May 15. No other wildlife related flight restrictions have been identified.

Bighorn sheep, mule deer, elk, pronghorn, mountain lion, and a variety of smaller mammals use the river as a source of water. Aquatic furbearers that use the lower Deschutes River include beaver, river otter, and mink.

### **6.3 Marine Mammals**

N/A.

### **6.4 Birds**

#### **6.4.1 Shorebirds**

Shorebirds found along the lower Deschutes River include killdeer, spotted sandpiper, Wilson's (common) snipe, and black-necked stilt.

#### **6.4.2 Waterfowl**

Waterfowl using the lower Deschutes River include mallard, Canada goose, common merganser, hooded merganser, and common and Barrow's goldeneyes. All of these species are known to breed in the area except for the hooded merganser and Barrow's goldeneye.

#### **6.4.3 Raptors**

Raptors found along the lower Deschutes River include bald eagle (breeding and wintering) and osprey (breeding). See information below under [Flight Restriction Zones/Sensitive Wildlife](#) for precautions near bald eagle nest sites. Bald eagles are federally listed as a threatened species. They are opportunistic foragers, thus, their diets vary considerably both spatially and temporally. Bald eagles in the Pacific Northwest primarily consume fish, waterfowl, jack rabbits, and a variety of carrion. The nesting season for bald eagles generally extends from mid-February through August. Bald eagle nests are invariably located in proximity to water, usually within 1 mile of a large body of water. Currently there are three known bald eagle nests located on or near the lower Deschutes River (see [Figure 6-1](#) and [Section 6.5](#) for nest locations and associated flight restrictions).

#### **6.4.4 Upland Gamebirds**

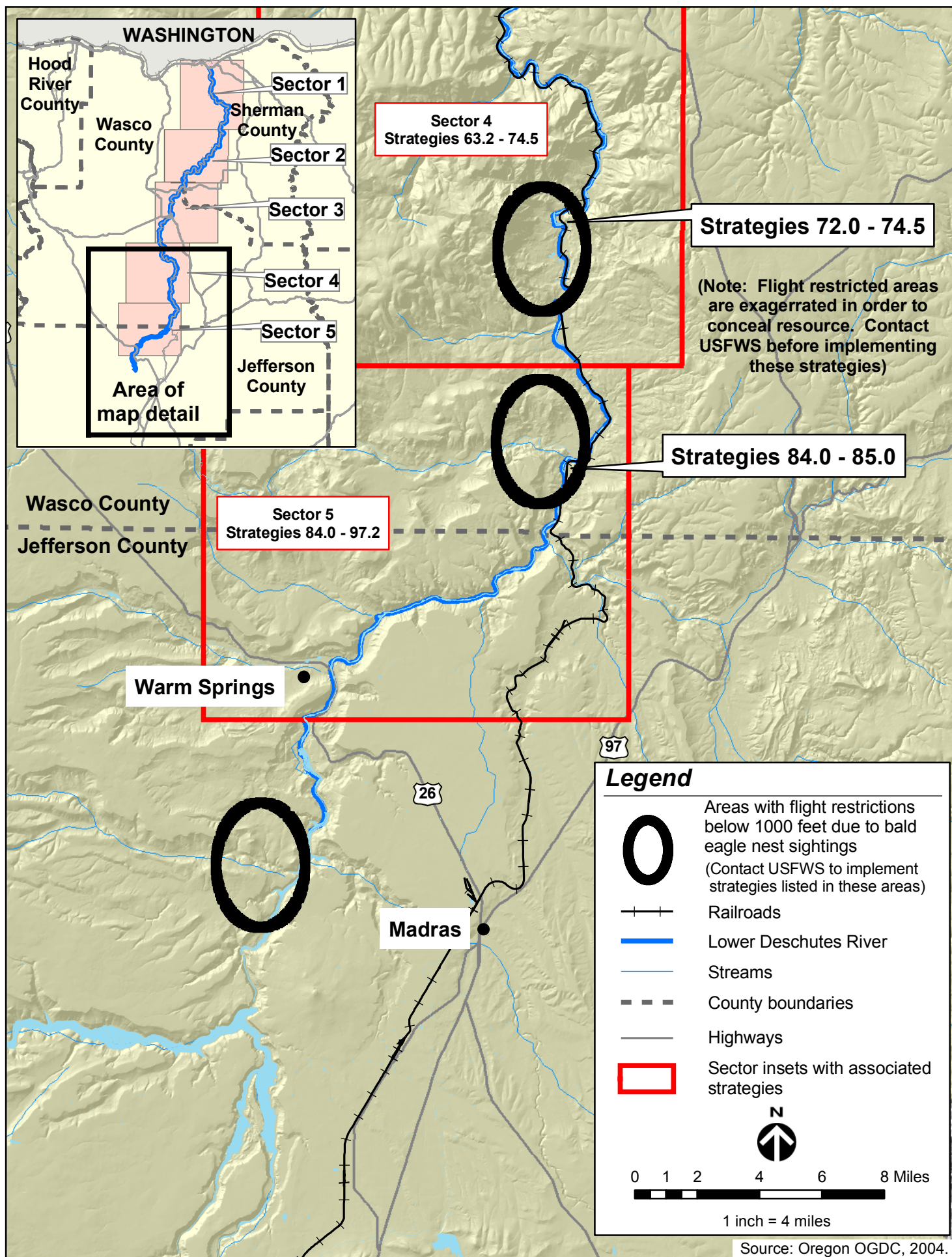
Upland gamebirds found along the lower Deschutes River include California quail, chukar (especially in dry summer months), and mountain quail (particularly in nearby draws and brushy riparian areas).

#### **6.4.5 Other Birds**

Other birds found along or near the lower Deschutes River associated with aquatic systems include swallows (several species), belted kingfisher, double-crested cormorant, and great blue heron. According to ODFW there currently are no great blue heron rookeries located in the portion of the Deschutes River covered by this geographic response plan.

#### **6.4.6 Bird Population Trends**

Winter surveys focusing on raptors, upland gamebirds, and waterfowl, and general breeding bird surveys are conducted annually to determine population trends in the lower Deschutes River subbasin. Bird populations that are monitored appear to be stable at this time.



**Figure 6-1. Bald eagle nest sightings and flight restrictions over the Lower Deschutes River.**



## 6.5 Flight Restriction Zones/Sensitive Wildlife

Flight restriction zones have been designated in the GRP to minimize disturbance to certain wildlife species. An identified location could represent a heron colony or the individual nest of a sensitive species such as bald eagle. While some zones may be restricted year around, others will be in effect only during the months listed in the matrix.

The no-fly bubble is the area within a 1,500 foot radius and below 1,000 feet in altitude around the location.

All aircraft, including those from the government, contractors or media, are expected to avoid these zones when restrictions are in effect. In the event that one of these zones must be entered during a spill response in the lower Deschutes River, clearance must be obtained from ODFW and the U.S. Fish and Wildlife Service (USFWS).

During oil spills, pilots are also asked to avoid disturbing any large concentrations of birds and other wildlife. By keeping a safe distance or altitude, pilots can prevent the accidental hazing of unaffected wildlife into oiled areas and minimize the risk of aircraft/ bird collisions.

The Wildlife Resource/Flight Restriction Table details the location, protected resources, and applicable season for each flight restriction zone (no flight restriction zones are known at this time).

**Table 6-2. Wildlife Resource/Flight Restriction Table**

Sector	Specific Flight Restrictions
1	No flight restrictions
2	No flight restrictions
3	No flight restrictions
4	Flights below 1,000 feet near strategies 72.0-74.5. Contact USFWS to implement these strategies.
5	Flights below 1,000 feet near strategies 84.0-85.0. Contact USFWS to implement these strategies.

## 6.6 Hazing

Hazing or directed harassment is a method used to drive or herd wildlife out of an area where they are at risk of becoming oiled. Hazing techniques include the use of visual and audio devices, personnel for herding, vessels and aircraft. In the right circumstances it can be an effective tool for protecting some wildlife species. In other cases it can be disastrous as unaffected wildlife can be driven into oiled areas, or forced to abandon nests or young.

Before hazing can begin for all species of wildlife in and along the lower Deschutes River, clearance must be obtained from ODFW and USFWS. All hazing efforts during a spill will be directed by these agencies. The deliberate harassment of wildlife without first securing permission from these agencies is a violation of Federal and State laws.

The following information must be provided for a determination on whether hazing might be authorized in a given situation:

- Description of the situation where hazing authorization is being sought
- Location to be hazed
- Species of wildlife to be hazed and number of animals
- Methods and equipment used
- Date and time of hazing
- Name, phone number, radio frequency, pager number and the amount of hazing experience of the individual requesting permission

The responsible agencies will evaluate each request on a case by case basis. All hazing of threatened and endangered species and all hazing by aircraft will be performed only under authority and general supervision of ODFW and USFWS, or persons designated by these agencies. Representatives of these agencies can be contacted through the planning section of the Unified Command System during the spill event.

## **6.7 Archeological Sites**

### **6.7.1 General Site Locations**

The Lower Deschutes River basin contains numerous sites of historic cultural importance both to the Warm Springs Tribe and Oregon State Historic Preservation Office. This document will not locate sites specifically.

### **6.7.2 Seasonal Sensitivity**

There are no known seasonal differences in sensitivity to cultural resources in the basin.

### **6.7.3 Recommendations**

It is recommended that a representative of the Oregon State Historic Preservation Office and the Cultural Resources Office of the Confederated Tribes of the Warm Springs be notified before cleanup of a spill commences. They should provide monitors to be present during cleanup operations.

### **6.7.4 Procedures for the Finding of Human Skeletal Remains**

Any human remains, burial sites, or burial-related materials that are discovered during construction will be treated with respect at all times.

- A. If the Responder or any member of the construction work force believes that he or she has encountered human skeletal remains, all work will be stopped immediately and the Incident Commander notified.
- B. The Incident Commander will be responsible for taking appropriate steps to protect the discovery. At a minimum, the immediate area of discovery will be flagged, and vehicles and equipment will not be permitted to traverse the discovery site. In no case will additional excavation be undertaken prior to consultation, and no exposed human remains will be left unattended.
- C. The Incident Commander or their representative will immediately contact the Oregon State Historic Preservation Office (SHPO), the Department Manager of Cultural Resources of the Warm Springs Tribe, and either the Wasco, Sherman, or Jefferson County Medical Examiner. The Medical Examiner will determine whether the discovery is a crime scene or human burial.
- D. If the remains are determined to be Native American and not to be connected with criminal activity, the Oregon State Archaeologist and Incident Command will confer on a treatment plan for the remains.
- E. If the remains are determined to be non-Native American or connected with criminal activity, the Medical Examiner will take charge.

### **6.7.5 Procedures for the Discovery of Cultural Resources**

- A. If the Monitor or any member of the construction work force believes that he or she has encountered cultural resources, all work will stop and the Incident Commander will be notified immediately. The area of work stoppage will be adequate to provide for the security, protection, and integrity of the materials. Prehistoric cultural resources may include:
  - Lithic debitage (stone chips and other tool-making byproducts)
  - Flaked or ground stone tools
  - Exotic rocks and minerals
  - Concentrations of organically stained sediments, charcoal, or ash
  - Fire-modified rock
  - Bone (burned, modified, or in association with other bone, artifacts, or features)
  - Shell.



## Lower Deschutes River Geographic Response Plan

Historic (i.e., over 50 years old) cultural material may include:

- Bottles or other glass
  - Cans
  - Ceramics
  - Milled wood, brick, concrete, metal, or other building material.
- B. If the Monitor believes that the discovery is a cultural resource, the Incident Commander will take appropriate steps to protect the discovery site. At a minimum, the immediate area of the discovery site will be flagged and vehicles and equipment will not be permitted to enter the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed.
- C. The Incident Commander or their representative will contact the Tribal Department Manager and the Oregon State Archaeologist and they will arrange for the discovery to be evaluated by a professional archaeologist. The archaeologist will determine whether the discovery is potentially eligible for listing on the National Register of Historic Places (NRHP). Criteria and integrity requirements for listing on the NRHP (36 CFR 60.4) will provide the standards for identification and evaluation of significance of cultural material.
- D. The archaeologist will contact the Tribal Department Manager and the Oregon State Archaeologist to seek consultation regarding the National Register eligibility of the discovery. If the Tribal Department Manager and SHPO determine that the discovery is eligible, they will consult with Incident Command to determine appropriate treatment of the discovery.

If adverse project affects to an eligible site cannot be avoided, a treatment plan will be developed and implemented. The Secretary of the Interior's *Standards for Archaeological Documentation* will apply, including provisions for a research design, reporting, and curation of recovered material and samples.

The particular data recovery measures applied to any given historic property will depend on the development of research questions and design of excavation strategies to acquire the data needed to answer those questions. Field notes, maps, plans, profiles, and photographs will document the process. The final report will follow style guidelines of the professional archaeological journal *American Antiquity*; it will synthesize the data collected and address the research questions posed.

## 7. Logistical Information

The following list was originally compiled at the Lower Deschutes River Geographic Response Plan Workshop, held in The Dalles, Oregon, on January 28-29, 2004. Areas of information include command posts, communications, equipment cache locations, inventory of local support equipment, air support, access points to the bay, and other pertinent logistical support. Use [Appendix C](#) to report corrections or updates.

**Table 7-1. Logistical Information.**

<b>Subject</b>	<b>Name</b>	<b>Characteristics</b>	<b>Contact</b>	<b>Phone #</b>
<b>Command Posts</b>	City of Maupin	City Park Building	Jon Helquist	541-395-2765
	Northern Wasco Fire, The Dalles		Chief Joe Richardson	541-296-4314
	City of Morrow, 309 Dewey St., Morrow	60 X 40	Shawn Payne	541-565-3100
	Deschutes State Park, Mouth of Deschutes	Mobile Command location	Darryl Fitzwater	541-739-2322
<b>Communications</b>	City of Maupin	FM Emergency NET		541-386-2698
	Tri County Dispatch, Sherman, Gilliam, Wheeler			800-277-1929
	Oregon Emergency Response Systems	Fire Net, Sat Phone, ARES	Dan Malin	800-452-0311
	Oregon State Police		The Dalles Patrol Office	541-296-2750
	Oregon National Guard			541-296-1827
	National Interagency Fire Cache	Boise		
	Redmond Fire Cache			
	DEQ			
<b>Cellphones</b>	Edge Wireless			866-350-3343
<b>Equipment Cache Locations</b>	Moody, OR (potential)	Conex Storage container, fast water boom, line throwers, small tools, fast water boom equipment	BNSF	800-832-5452
	Maupin, OR (potential)	Conex Storage container, fast water boom, line throwers, small tools, fast water boom equipment	BNSF	800-832-5452
<b>Inventory of Local Support Equipment</b>	NRC Environmental, State Contractor	Full complement of response equipment including booms, boats, tanks, vac trucks		503-283-1150
	Cowlitz Clean Sweep		Bob Matson	888-423-6316
	Global Diving and Salvage		Devon Grennan	205-623-0621
	MFSA		Brent Way	503-220-2097
	Tidewater Environmental		Holly Robinson	800-562-1607
	RFC Corporation		Rick Franklin	800-428-1516
	EQM, USEPA contractor	Full complement of response equipment including booms, boats, tanks, vac trucks	Ron McManamy	425-673-2900
	RM Cat		Bob Janik	



## Lower Deschutes River Geographic Response Plan

<b>Subject</b>	<b>Name</b>	<b>Characteristics</b>	<b>Contact</b>	<b>Phone #</b>
<b>Vehicle Rentals</b>	Jim Smolich Motors			541-389-1177
	Thomas Sales & Service			541-389-3031
	Robbertson Ford			541-382-4521
<b>Helicopter / Air Support</b>	Wasco State Airport	Airport		
	The Dalles Airport	Airport		541-298-4148
	Evergreen Helicopters			503-472-9361
	Columbia Helicopters			503-678-1222
	Erickson Air Crane			541-664-7615
	Hillsboro Helicopters			800-345-0949
	Davidson Flat RM 74.5	Landing zone		
	Whiskey Dick RM 77.5	Landing zone		
<b>Access Points / Boat Ramps</b>	Heritage Landing (RM 0.4)			
	Beavertail (RM 31.0)			
	Oakbrook (RM 35.8)			
	Pine Tree (RM 39.3)			
	Buck Hollow (RM 42.8)			
	Sandy Beach (RM 46.0)			
	Lower Blue Hole (RM 49.0)			
	Blue Hole (RM 49.8)			
	Grey Eagle (RM 50.0)			
	Maupin City Park (RM 51.8)			
	Harpham Flat (RM 55.8)			
	RM 59.0			
	Warm Springs Boat Ramp (RM 97.2)			
<b>Staging Areas</b>	Heritage Landing Park (RM 0.4)			
	Colorado Camp (RM 3.9)			
	Gordon Ridge Camp (RM 5.6)			
	Bedsprings (RM 8.6)			
	Harris Ranch (RM 12.0)			
	Macks Canyon (RM 24.0)			
	Private land (RM 28.9)			
	Rattlesnake Canyon (RM 30.2)			
	Jones Canyon Camp (RM 34.2)			
	Oakbrook (RM 35.8)			
	Twin Springs Camp (RM 38.2)			
	Buck Hollow (42.7)			
	Sandy Beach (RM 45.4)			
	Lower Blue Hole (RM 48.4)			
	Grey Eagle (RM 49.6)			
	Maupin City Park (RM 51.9)			
	Harpham Flat (RM 55.8)			
	Nena (RM 58.6)			
	Four Chutes (RM 63.4)			
	Buckskin Mary (RM 63.6)			
	Two Springs Ranch (RM 69.2)			
	North Junction (RM 72.9)			
	Davidson Flat (RM 74.1)			
	South Junction Camp (RM 84.0)			
	Trout Creek Camp (RM 88.0)			
	Dry Creek Camp (RM 94.4) (tribal)			
	Mecca Flat (RM 95.8)			

## Lower Deschutes River Geographic Response Plan

<b>Subject</b>	<b>Name</b>	<b>Characteristics</b>	<b>Contact</b>	<b>Phone #</b>
<b>Staging Areas (continued)</b>	Warm Springs Lumber Mill (RM 97.4)			
	Warm Springs Boat Ramp (RM 98.0)			
<b>Locations that roads cross railroad tracks</b>	River mile 0.4, railroad milepost 4.9	Heritage Landing		
	River mile 44.2, railroad milepost 47.2	Sherars Bridge		
	River mile 51.8, railroad milepost 54.4	City of Maupin		
<b>Recreational activities which could interfere</b>	Rafting		BLM	541-416-6776
	Fly fishing		BLM	541-416-6776
	Camping		BLM	541-416-6776
<b>Tribal Resources</b>	Richard Craig, Warm Springs	CTWIR (hazmat)		541-553-3462
	Sally Bird, Warm Springs	CTWIR (cultural)		541-553-3548
		Yakima Indian Nation		800-847-3087
<b>Key Elected Officials</b>	Dennis Ross	Mayor - Maupin		541-395-2698
	Rick Allen	Mayor - Madras		541-475-2344
	Rob Van Cleve	Mayor - The Dalles		
	Dan Ericksen	Judge - Wasco		541-506-2520
	Mike McArthur	Judge - Sherman		541-565-3650
<b>County Emergency Managers</b>	Sherman		Shawn Payne	541-565-3100
	Jefferson		Jack Jones, Sheriff	541-475-6520
	Wasco		Jack Linderman	541-296-6424
<b>State Haz Mat Teams</b>	HM #3 Gresham	State Haz Mat Team	Steve Best	618-2590
	HM #7 Redmond	State Haz Mat Team	Karl Johannsen	548-5921
	HM #10 Hermiston	State Haz Mat Team	Steve Fraiser	567-8822
<b>Fire Departments</b>	Maupin Fire Department		Jon Helquist	541-395-2765
	Jefferson County Fire Department		Jerry Street	541-325-5001
	Sherman County Fire Department		Shawn Payne	541-565-3100
	Wasco County Emergency Services		Jack Linderman	541-296-6424
	BLM			541-416-6700
<b>Local Support Personnel</b>	<b>Jet Boats</b>	<b>ODFW The Dalles</b>		<b>541-296-4628</b>
	<b>Jet Boats</b>	<b>CTWIR</b>	<b>Richard Craig</b>	<b>541-553-3462</b>
	<b>Jet Boats</b>	<b>BLM</b>		<b>541-395-2531</b>
	<b>Jet Boats</b>	<b>DEQ Laboratory</b>		<b>503-220-5983</b>
	Sanitation	Bishop Sanitation		509-773-4707
<b>Volunteers</b>	SOLV	Goldendale	Jack McGowan	503-647-9855, 387-3808
<b>Wildlife Rehabilitation Facilities</b>	ODFW - Portland (coordinator)		Dale Nelson	(503) 872-5269 x 5348
	ODFW - Portland		Rose Owens	503-947-6085
	IBRRC	Expert	Curt Klumpner	510-841-9086
	NRC	Bird Trailer	Tim Archer	503-283-1150
	MFSA	Bird Trailer	Brent Way	503-220-2097



## Lower Deschutes River Geographic Response Plan

<b>Subject</b>	<b>Name</b>	<b>Characteristics</b>	<b>Contact</b>	<b>Phone #</b>
<b>Wildlife Rehabilitation Facilities (continued)</b>	Audubon	Rehabilitation Specialist	Bob Sallinger	503-292-0304
<b>Housing/Feeding, Support</b>				
<b>Lodging</b>	City of Maupin	Deschutes Motel		541-395-2626
		Oasis Resort		541-395-2611
		CJ Lodge		541-395-2404
	City of The Dalles	Best Western Umatilla House		541-296-9107
		Comfort Suites		541-308-1000
		Days Inn		541-296-1191
		Inn at The Dalles		541-296-1167
		Lone Pine Village		541-298-2800
		The Oregon Trail Hotel		541-298-2473
		Quality Inn		541-298-5161
		Shamrock		541-296-5464
		Shilo Inn		541-298-5502
		Super 8		541-296-6888
	City of Moro	Tall Winds		541-565-3519
<b>Caterers</b>	see Yellow Pages			
	OK's Cascade	Mobil Kitchen		
<b>Interim Storage Permits</b>				
<b>Washington DOE</b>		Emergency Management		800-258-5990
		Eastern Region		509-456-2926
<b>USEPA</b>	On-Scene Coordinators	Contractor and other federal resources		206-553-1263
<b>Oak Springs Fish Hatchery</b>	ODFW			541-395-2546
<b>Oregon Dept. of Transportation</b>	Sam Wilkins		541-296-2215	

## Appendix A: Protection Techniques

### A-1. Summary of Protection Techniques

Protection Techniques	Description	Primary Logistical Requirements	Limitations
<b>ONSHORE (unlikely to be used in Deschutes River due to high flow rates)</b>			
<b>Geotextiles</b>	A roll of geotextile, plastic sheeting, or other impermeable material is spread along the bottom of the supra-tidal zone and fastened to the underlying logs or stakes placed in the ground.	<ul style="list-style-type: none"> <li>Geotextile - 3 m wide rolls</li> <li>Personnel - 5</li> <li>Misc. - stakes or tie-down cord</li> </ul>	<ul style="list-style-type: none"> <li>Low sloped shoreline</li> <li>High spring tides</li> <li>Large storms</li> </ul>
<b>Sorbent Barriers</b>	A barrier is constructed by installing two parallel lines of stakes across a channel, fastening wire mesh to the stakes and filling the space between with loose sorbents.	Per 30 meters of barrier <ul style="list-style-type: none"> <li>Wire mesh - 70 m x 2 m</li> <li>Stakes - 20</li> <li>Sorbents - 30 m<sup>2</sup></li> <li>Personnel - 2</li> <li>Misc. - fasteners, support lines, additional stakes, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Waves &gt; 25 cm</li> <li>Currents &gt; 0.5 m/s</li> </ul>
<b>Inlet Dams</b>	A dam is constructed across the channel using local soil to exclude oil from entering channel.	<ul style="list-style-type: none"> <li>Loader - 1</li> <li>Personnel - equipment operator and 1 worker or several workers w/shovels</li> </ul>	<ul style="list-style-type: none"> <li>Waves &gt; 25 cm</li> <li>Freshwater outflow</li> </ul>
<b>RIVERINE</b>			
<b>Exclusion Booming</b>	Boom is deployed across or around sensitive areas and anchored in place. Approaching oil is deflected or contained by boom.	Per 300 meters of Boom <ul style="list-style-type: none"> <li>Boats - 1</li> <li>Personnel - boat crew and 3 boom tenders</li> <li>Misc.- 6 anchors, anchor line, buoys, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Currents &gt; 0.5 m/s</li> <li>Breaking waves &gt; 50 cm</li> <li>Water depth &gt; 20 m</li> </ul>
<b>Deflection Booming</b>	Boom is deployed from the shoreline away from the approaching slick and anchored or held in place. Oil is deflected away from shoreline.	Single Boom, 0.75 m/s current <ul style="list-style-type: none"> <li>Boom - 60 m</li> <li>Boats - 1</li> <li>Personnel - boat crew + 3</li> <li>Misc. - 3 anchors, line, buoys, recovery unit</li> </ul>	<ul style="list-style-type: none"> <li>Currents &gt; 1.0 m/s</li> <li>Breaking waves &gt; 50 cm</li> </ul>
<b>Diversion Booming</b>	Boom is deployed from the shoreline at an angle towards the approaching slick and anchored or held in place. Oil is diverted towards the shoreline for recovery.	Single Boom, 0.75 m/s current <ul style="list-style-type: none"> <li>Boom - 60 m</li> <li>boats - 1</li> <li>Personnel - boat crew + 3</li> <li>Misc. - 3 anchors, line, buoys, recovery unit</li> </ul>	<ul style="list-style-type: none"> <li>Currents &gt; 1.0 m/s</li> <li>Breaking waves &gt; 50 cm</li> </ul>



## Lower Deschutes River Geographic Response Plan

Protection Techniques	Description	Primary Logistical Requirements	Limitations
<b>Skimming</b> (unlikely unless oil enters Columbia River or near the mouth of the Deschutes River)	Self-propelled skimmers work back and forth along the leading edge of a windrow to recover the oil. Booms may be deployed from the front of a skimmer in a "V" configuration to increase sweep width. Portable skimmers are placed within containment booms in the area of heaviest oil concentration.	Self-propelled (None) Towed <ul style="list-style-type: none"> <li>• Boom - 200 m</li> <li>• Boats - 2</li> <li>• Personnel - boat crews and 4 boom tenders</li> <li>• Misc. - towlines, bridles, connectors, etc.</li> </ul> Portable <ul style="list-style-type: none"> <li>• Hoses - 30 m discharge</li> <li>• Oil storage - 2000 liters</li> </ul>	<ul style="list-style-type: none"> <li>• High winds</li> <li>• Breaking waves &gt; 50 cm</li> <li>• Currents &gt; 1.0 m/s</li> </ul>

Source: R. Miller of Clean Sound Cooperative.

## A-2. Fast Water Booming Techniques: Current Chip Log and Maximum Boom Deflection Angle

The table uses the time for floating debris to drift 100 feet. This is accurately determined by anchoring a line with two floating buoy markers attached at a spacing 100 feet apart. Floating debris is then thrown into the water approximately 20 feet upstream of the first buoy marker. Determine the time it takes the debris to transit the distance between the two marker buoys in seconds. This assumes that the minimum escape velocity under a boom perpendicular to the current (90 degrees) is 0.7 knots. The table provides an estimate of the length of boom required for deflecting oil at a specified angle for a 110 foot profile (perpendicular length) to the current. It also provides an estimate of the number of anchors or shoreline tiebacks required for that length of boom assuming anchor points are required every 50 feet.

Knot = 1.4 mile/hr      or      6,961 ft/hr      or      1.93 sec/ft (1.7)

.09 ft/sec = ½ knot

2.5 sec/ft = 1.5 knot

4.2 sec/ft = 2.5 knot

1.4 miles = 1 nautical mile

<b>Time to Drift 100 Feet (seconds)</b>	<b>Velocity (ft/sec)</b>	<b>Velocity (m/sec)</b>	<b>Velocity (knots)</b>	<b>Max. Boom Deflection Angle (degrees)</b>	<b>Boom for 100 Foot Profile to Current (feet)</b>	<b>Anchors if Placed Every 50 Feet (number)</b>
6	16.7	5.08	10.00	4.0	1,429	30
8	12.5	3.81	7.50	5.4	1,071	22
10	10.0	3.05	6.00	6.7	857	18
12	8.3	2.54	5.00	8.0	714	15
14	7.1	2.18	4.29	9.4	612	13
17	5.9	1.79	3.53	11.4	504	11
20	5.0	1.52	3.00	13.5	429	10
24	4.2	1.27	2.50	16.3	357	8
30	3.3	1.02	2.00	20.5	286	7
40	2.5	0.76	1.50	27.8	214	5
60	1.7	0.51	1.00	44.4	143	4
>86	<1.2	<0.35	<0.70	90.0	100	3



**A-3. Current Drag Force on One-Foot Boom Profile to Current**

The major force exerted on a boom is caused by the water drag on the skirt. Wave forces can increase the drag factor by a factor of two to three depending upon the wave height, period, and loading dynamics. Wind force is less than current and waves bit is also a factor. In high current situations, drag is sometimes increased by water piling upon the boom, causing some submergence and increased drag forces, often resulting in mooring failure. In this situation, the 100-foot section of 4 X 6 diversion boom (4-inch floatation and 6-inch draft) could take the hydrodynamic load. A replacement section 50 feet long was able to withstand the reduced forces with submerging.

The effects of current velocity and boom draft on boom drag force can be seen in the table. Drag increased with draft in a linear fashion while current increased drag more dramatically, to the square of the velocity.

Velocity/Knots	Boom Drag Force (pounds)			
	Draft 0.5 Feet	Draft 1.0 Feet	Draft 1.5 Feet	Draft 2.0 Feet
0.5	0.7	1.3	2.0	2.7
1.0	2.7	5.3	8.0	10.7
1.5	6.0	12.0	18.0	24.0
2.0	10.7	21.3	32.0	42.6
2.5	16.7	33.3	50.0	66.6
3.0	24.0	48.0	72.0	95.9
3.5	32.6	65.3	97.9	130.6
4.0	42.6	85.3	127.9	170.6
4.5	54.0	85.3	127.9	170.6
4.5	54.0	107.9	161.9	215.9
5.0	66.6	133.3	199.9	266.5
5.5	80.6	161.2	241.8	322.5
6.0	95.9	191.9	287.8	383.8
6.5	112.6	225.2	337.8	450.4
7.0	130.6	261.2	391.8	522.3
7.5	149.9	299.8	449.7	599.6
8.0	170.6	341.1	511.7	682.2

**A-4. Approximate Safe Working Loads/Tensile Strength of New Rope**

<b>Rope Diameter (inches)</b>	<b>Manila No. 1 (3-strand) (pounds)</b>	<b>Nylon (3-strand) (pounds)</b>	<b>Polyester (3-strand) (pounds)</b>
5/16	200 / 1,000	500 / 2,500	500 / 2,500
3/8	270 / 1,350	700 / 3,500	700 / 3,500
7/16		1,140 / 5,700	
1/2	530 / 2,650	1,250 / 6,250	1,200 / 6,000
5/8	880 / 4,400	2,100 / 10,500	1,950 / 9,750
3/4	1,080 / 5,400	2,750 / 5,400	2,300 / 11,500

Towing load can be significant when a boom is anchored on one end and pulled against the current. Boats must have sufficient horsepower and be properly rigged to tow. Lines must be capable of withstanding the forces, and the boom must have a tension member capable of high loads. If the boom is extended behind the tow boat and pulled free in the current, there is only the frictional drag along the boom. Because this drag is a function of the boat speed, proper motor size becomes a function of boom size and length, boat size, and water velocity. Although free towing drag is low, when one end of the boom is anchored to the shore, a small boat may be incapable of positioning the boom because of the high current drag exerted on the boom. The boom must be able to withstand the forces. The tension member must not become detached from the boom due to differential expansion.

Attempting to moor a boom in a straight line across a current (90 degrees) is not recommended. The result is a sag in the boom that will trap free floating oil at a point inaccessible to the shore. In swift currents, the resulting forces on moorings can cause large lines of break and present possible safety hazards. The current can be so swift that the boom may tend to dip and become completely or partially submerged. If this happens, the boom's position should be adjusted. The total force on the mooring points will be a combination of the forces caused by current, wind, and waves.

Boom positioning is an important point. The first step is to decide where the boom should be located. It is likely that the boom would be on an angle to the current; therefore, the prime concern becomes the location of the upstream end. If the selected upstream location is inaccessible, a spot further upstream can be used for access and the boat and boom allowed to drift to the selected mooring site. The boom can be secured to trees, stakes, anchors, or other solid objects. Do not attach boom to vehicles of any type or size.



**A-5. Approximate Water Travel Time Between Various Points Along the Lower Deschutes River**

<b>Location</b>	<b>Warm Springs Boat Ramp (RM97)</b>	<b>Trout Creek (RM88)</b>	<b>Davidson Flat (RM74)</b>	<b>Buckskin Mary (RM64)</b>	<b>Devils Canyon (RM57)</b>	<b>Maupin (RM51)</b>	<b>Sherars Bridge (RM44)</b>	<b>Jones Canyon (RM34)</b>	<b>Ferry Canyon (RM26)</b>	<b>Airstrip (RM18)</b>	<b>Deer Spot (RM9)</b>
Warm Springs Boat Ramp (RM97)											
Trout Creek (RM88)	2 hr. 15 min.										
Davidson Flat (RM74)	5 hr. 50 min.	3 hr. 35 min.									
Buckskin Mary (RM64)	7 hr. 50 min.	5 hr. 35 min.	2 hr.								
Devils Canyon (RM57)	9 hr. 5 min.	6 hr. 35 min.	3 hr. 15 min.	1 hr. 15 min.							
Maupin (RM51)	10 hr. 20 min.	8 hr. 5 min.	4 hr. 30 min.	2 hr. 30 min.	1 hr. 15 min.						
Sherars Bridge (RM44)	12 hr.	9 hr. 45 min.	6 hr. 10 min.	4 hr. 10 min.	2 hr. 55 min.	1 hr. 40 min.					
Jones Canyon (RM34)	12 hr. 50 min.	10 hr. 35 min.	7 hr.	5 hr.	3 hr. 45 min.	2 hr. 30 min.	50 min.				
Ferry Canyon (RM26)	14 hr. 40 min.	12 hr. 25 min.	8 hr. 50 min.	6 hr. 50 min.	5 hr. 35 min.	4 hr. 20 min.	2 hr. 40 min.	1 hr. 50 min.			
Airstrip (RM18)	16 hr. 30 min.	14 hr. 15 min.	10 hr. 40 min.	8 hr. 40 min.	7 hr. 25 min.	6 hr. 10 min.	4 hr. 30 min.	3 hr. 40 min.	1 hr. 50 min.		
Deer Spot (RM9)	18 hr. 20 min.	16 hr. 5 min.	12 hr. 30 min.	10 hr. 30 min.	9 hr. 15 min.	8 hr.	6 hr. 20 min.	5 hr. 30 min.	3 hr. 40 min.	1 hr. 50 min.	
Deschutes State Park (RM0)	20 hr. 15 min.	18 hr.	14 hr. 25 min.	12 hr. 25 min.	11 hr. 10 min.	9 hr. 55 min.	8 hr. 15 min.	7 hr. 25 min.	5 hr. 35 min.	3 hr. 45 min.	1 hr. 55 min.

Source: Approximate rafting times between points based on combination of personal experience by the Northwest Rafters Association and Oregon River Tours by John Garren, 1991.

## **Appendix B: Geographic Response Plan Contributors**

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### **Industry and Response Contractors**

Herrera Environmental Consultants, Inc.  
EnviroSpatial  
Environmental Quality Management  
Global Diving and Salvage  
National Response Corporation (NRC)  
Cowlitz Clean Sweep (CCS)

Clean Rivers Cooperative, Inc.  
Northwest Archaeological Associates, Inc.  
Richard Franklin Corporation  
Burlington Northern Santa Fe Railroad  
Columbia Gorge Discovery Center  
Northwest Rafters Association

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## **Appendix C: Geographic Response Plan Comments/Corrections/Suggestions**

If you have any questions regarding this document or find any errors with this document, please notify one of the following agencies:

- Environmental Protection Agency Region 10
- Oregon Department of Environmental Quality, Waste Management & Cleanup Division

You can use the tear out suggestion form or contact an agency using one of the following:

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