APPENDIX B

Correspondence

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Crystal mountain

August 25, 2004

Washington Department of Transportation
Steve Lowell, Chief Engineering Geologist
Materials Laboratory
P.O. Box 47365
Olympia, WA 98504-7365

RE: SR 410/Mt. Rainier National Park

Dear Mr. Lowell:

Crystal Mountain, Inc. is inquiring as to what Washington State Department of Transportation (WSDOT) plans to do regarding making permanent repairs to SR410 between MP 57.8 and MP 58.6 for the containment of the White River? This section of our State Highway located in Mt. Rainier National Park will have the roadbed washed away again during the next significant storm.

When the roadbed washes out, the highway just west of the Park boundary will turn into riverbed and flood numerous recreational cabins as it did last winter. We fear that once a serious erosion problem starts in this section of the highway it will cut off access to Crystal Mountain Boulevard (Pierce County road system) and the Crystal Mountain ski area.

We fully understand that this is a multi jurisdictional issue. However with such a great potential for harming personal property on USDA Forest Service public land and cutting off traffic to one of this state's premier ski areas a permanent solution needs to be reached to contain the White River. We would like to know how you plan to resolve this forthcoming disaster.

Sincerely,

William Steel
Director of Planning

Cc: Jennifer Dunn, Member of U.S. Congress
Pam Roach, State Senator
Jim Franzel, Snoqualmie Ranger
Dave Uberuga, Mt. Rainier National Park 360-569-2211
Albert Pollmar, White River Recreation Association

DAN BLACKWELL EXT. 3365

33914 Crystal Mtn. Blvd.
Crystal Mountain WA 98022
FAX 360.663.3097
TEL 360.663.2265
A Boyne USA Resort

SUSTAINABLE SLOPES

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Washington State Department of Transportation
Douglas B. MacDonald
Secretary of Transportation

Northwest Region
15700 Dayton Avenue North
P.O. Box 330310
Seattle, WA 98133-9710

206-440-4000
TTY 1-800-833-6388
www.wsdot.wa.gov

October 29, 2004

William Steel, Director of Planning
Crystal Mountain Resort
33914 Crystal Mountain Boulevard
Crystal Mountain, WA 98022

Dear Mr. Steel:

Thank you for your August 25th letter to Steve Lowell, Washington State Department of Transportation (WSDOT) Chief Geologist, expressing your concern for potential damage to SR 410 by flooding of the White River near Crystal Mountain Boulevard. We share your concern for future flooding and possible damage to the highway. WSDOT takes pride in keeping our highways safe and operational at all times and will be monitoring it closely.

A WSDOT geologist, who specializes in river reach analysis, has been assigned to evaluate and make recommendations for a solution. The White River's headwaters originate from glaciers on Mt. Rainier and carry large amounts of gravel into the lower reaches of the river. This causes the riverbed to aggrade to levels higher than the surrounding terrain, which encourages the river to seek lower ground. This is a natural elevation than the river just east of Crystal Mountain Boulevard.

Once recommendations are received from the geologist, this project will be placed on our Chronic Environmental Deficiency (CED) list. The CED is a list of problem areas that have repeatedly threatened the state highway system in the past. Since this is a statewide list, this project must compete with many other projects for a very limited amount of funding.

As you mentioned in your letter, this is a multi-jurisdictional issue. This section of SR 410 is operated by WSDOT on a land easement deed from the National Parks Service (NPS) and the United States National Forest (USNF). NPS is the lead agency that is responsible for major structural road repairs and rehabilitation within the park boundary. We will be closely coordinating with NPS and USNF as we work towards a permanent solution to this problem.

Keeping SR 410 open and functioning will continue to be a high priority. If the river leaves it's banks and closes the highway, every attempt will be made to reopen the road as soon as possible. WSDOT does understand that this is the only access to your ski area

and is crucial to your operation. It is important to WSDOT to keep all of our highways open and we will do everything we can to keep traffic moving safely.

If you have questions or need additional information, please feel free to contact Patrick Moylan, Maintenance Manager, at 206.440.4655.

Sincerely,

David P. McCormick, P.E.
Assistant Regional Administrator for Maintenance & Traffic

PM:eta

cc: Representative Jennifer Dunn, U.S. House of Representatives
Senator Pam Roach, Washington State
Jim Franzel, Snoqualmie Ranger
Dave Uberuga, Mt. Rainier National Park
Albert Pollmar, White River Recreation Association
Ron Paananen, WSDOT

APPENDIX B

Site Photographs

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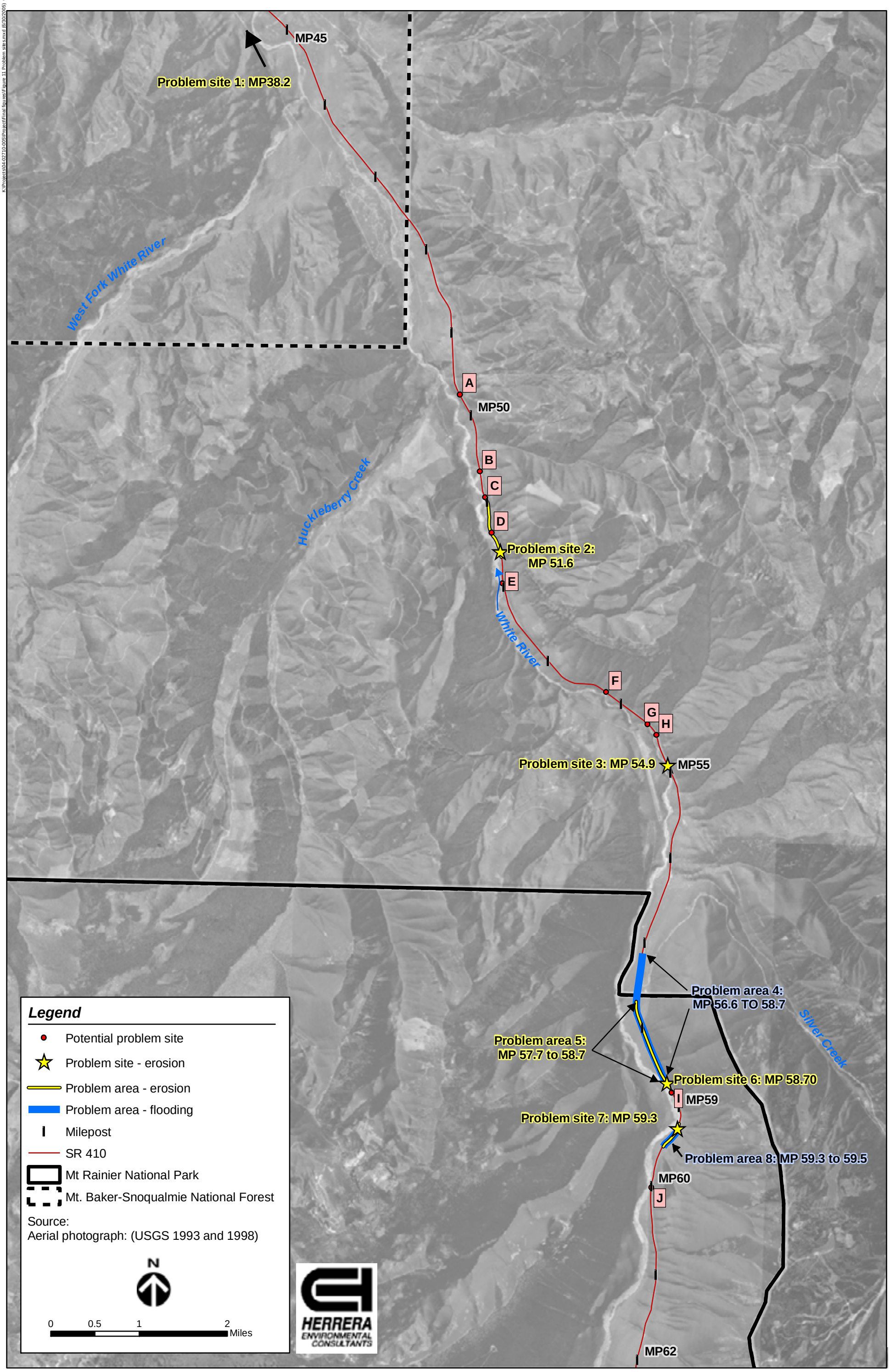

Figure B-1. Problem and potential problem sites along the White River between MP 45 and MP 62

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Photographic illustrations of unique geomorphic processes in the Upper White

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Example of buried logjam matrix situated beneath old-growth floodplains of the Upper White River. This site is located near Site 8 along right bank of mainstem river channel (MP 59.6). These buried logs form a geotechnical matrix that together with the living forest effectively prevents the mainstem river from moving into these floodplain areas even when the river has aggraded well above the floodplain. Side channels are common in these forest floodplains and provide important habitat within the Upper White. Presence of this type of forest has been crucial in preventing the complete loss of SR 410 at site 4 since 2003. April 26, 2005.

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Another example of buried log matrix beneath old growth floodplain forest along right (East) side of river near MP 51. April 25, 2005.

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Example of old-growth conifer floodplain forests situated along mainstem channel of the Upper White River (in background), MP 51. Note river bed is at approximately same elevation of floodplain, even though some of the floodplain trees are at least 400 years old. April 25, 2005.

Example of side channel headcut where side channel is actively being cut into mature floodplain forest. Left bank of White River near MP 56 opposite Silver Creek confluence (Mt. Baker-Snoqualmie National Forest).

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Side channel upstream of headcut illustrated in previous figure. Left bank floodplain of Upper White River near MP 56 (opposite Silver Creek confluence).

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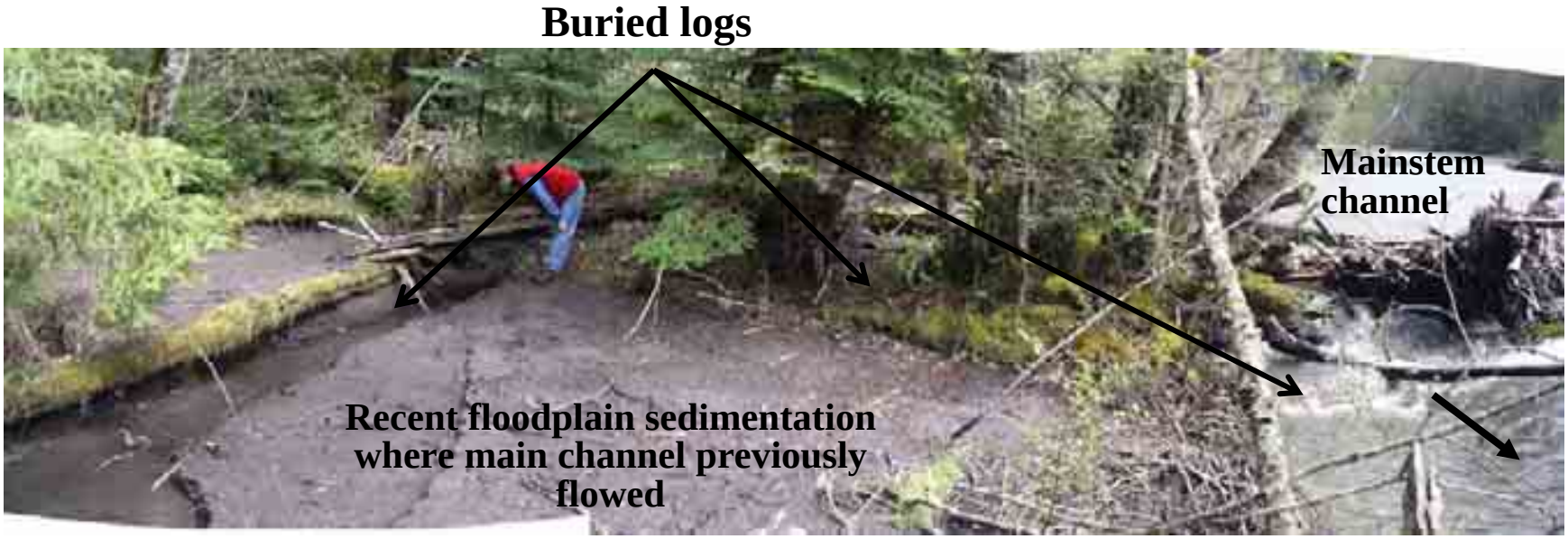

Example of where fallen trees along the river's right bank created a logjam which effectively deflected the river and created new forested floodplain. Trees that initiated logjam are almost completely buried in river bed and newly accreted floodplain. Site located near MP 51. April 25, 2005.

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Side channel and buried forest near MP 60.3 (upstream of Site 8). Forest burial began between 1966 and 1979 (see Figure ##). Sedimentation at this site raised the ground surface up to 6 feet. Trees colonizing the site are 5-15 years old, implying that sedimentation didn't occur in a single year but continued several years after 1979. This extended period of landscape adjustment is consistent with current sedimentation at Site 4. April 27, 2005.

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Buried cedar trees near MP 60.3 (upstream of Site 8). Forest burial occurred between 1966 and 1979 (see Figure ##). Trees colonizing the site are 10-15 years old, implying that sedimentation didn't occur in a single year but continued several years after 1979. This extended period of landscape adjustment is consistent with current sedimentation at Site 4. April 27, 2005.

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Buried cedar tree at MP 60.3. Note sedimentation is not limited to overbank fine sediment but coarse gravel and cobble (lower right corner in photo). April 27, 2005.

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Natural flow deflection jam upstream of Forest Service bridge at SR 410 MP 49.5. If large conifers were not present on left bank the river would be flowing where the jam is located and posed a much more significant threat to the bridge.

Same site from within flow deflection jam. This natural jam was responsible for preventing river from end cutting left abutment of Forest Service bridge. In addition to protecting bridge, logjam is also creating high quality side channel habitat and cover.

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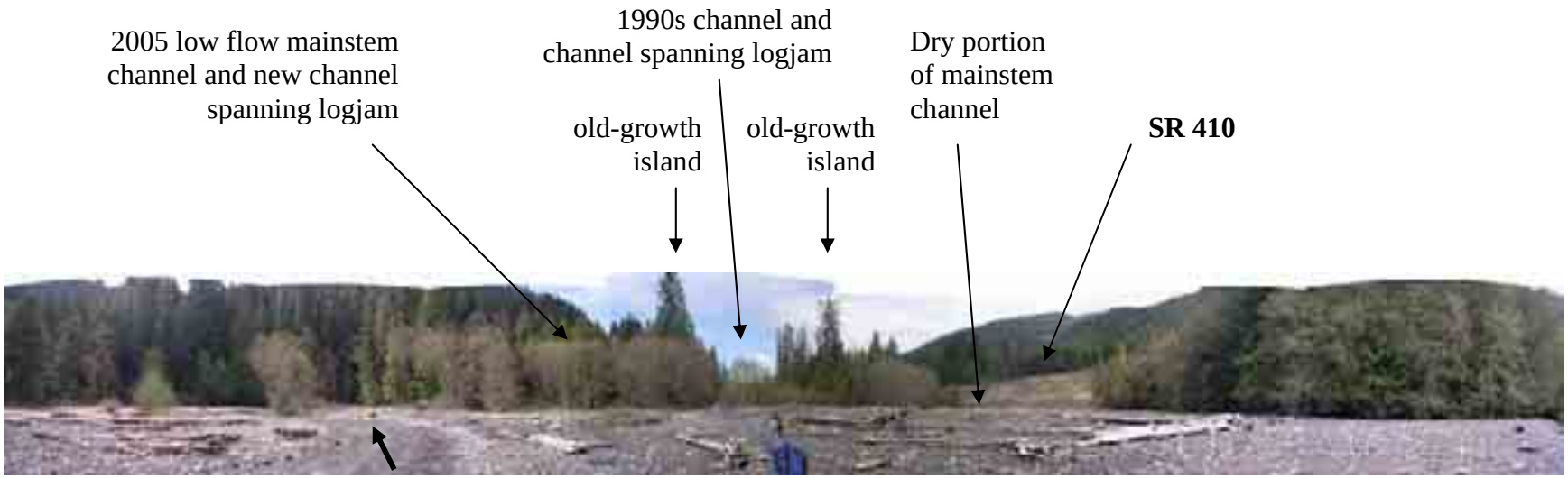

MP 50.7. Looking downstream at reach subject to major changes in mainstem White River channel, unlike reaches within Mt. Rainier National Park where mainstem channel has remained in essentially the same location for centuries. In this reach the mainstem channel moves within islands of old growth forest, re-occupying its previous positions which form the least resistant paths. Because of this, the river will again re-occupy channel path running along SR 410. It is recommended that an LWD matrix and forest buffer be established along the SR 410 embankment to reduce future erosion risks to the highway. April 25, 2005.

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Channel spanning logjam across low flow portion of mainstem channel at MP 50.5. Logjams such as this have formed throughout this reach of the river and directly controlled the river's course and grade. In addition these logjams create the most diverse and highest quality habitat found in the Upper White River. April 25, 2005.

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Existing Problem Sites

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Site 1, Milepost 38 looking downstream at eroding right bank upstream of rock revetment. April 25, 2005.

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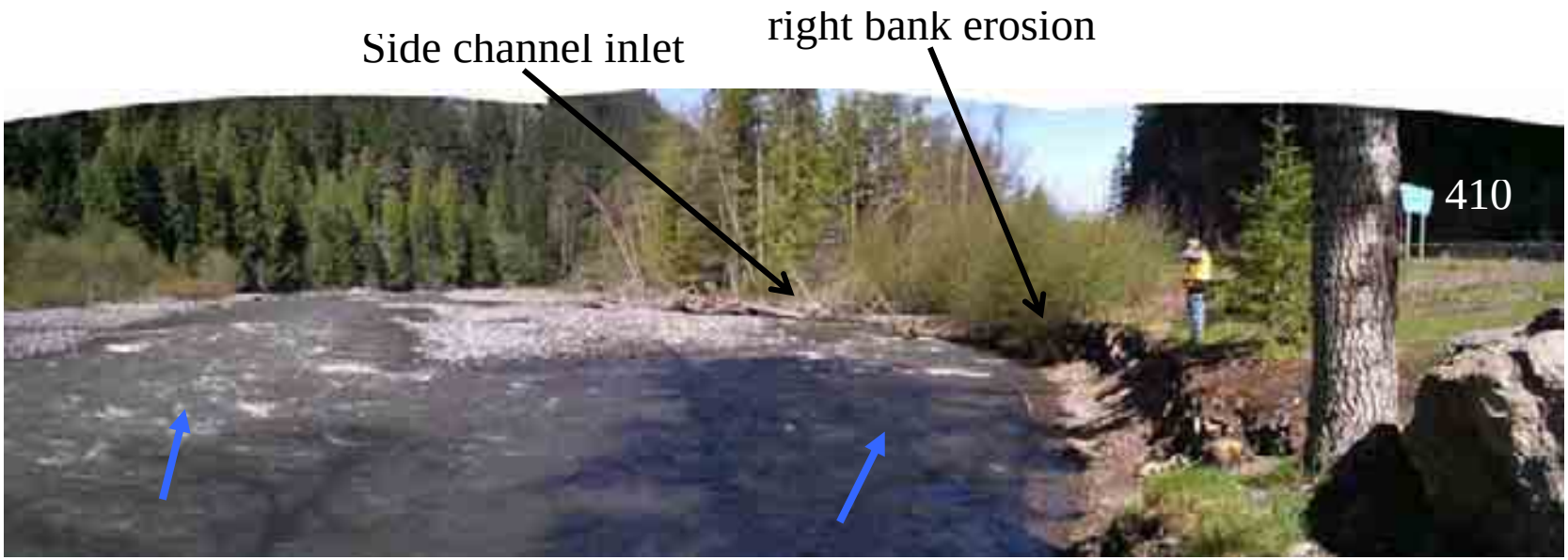

Site 2, Milepost 51.6 Skookum Falls Overlook looking downstream at side channel inlet. April 25, 2005.

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Site 2, Milepost 51.6, Skookum Falls Overlook eroding right bank. Note exposed geotextile at toe of bank installed in previous bank protection measures. April 25, 2005.

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Site 2, Milepost 51.6, Skookum Falls Overlook. Side channel inlet looking upstream. April 25, 2005.

Site 2, Milepost 51.6. Looking downstream from side channel inlet at SR 410 embankment. April 25, 2005.

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Site 2, MP 51.6. Side channel flowing along SR 410 downstream of Skookum Falls Overlook. April 25, 2005.

Site 2, MP 51.6. Side channel flowing along SR 410 embankment downstream of Skookum Falls Overlook. Inter-locking large trees should be placed at sites such as this where there are only sparsely spaced small trees to armor highway embankment and trap sediment. April 25, 2005.

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Site 2, MP 51.6. Example of natural LWD armoring at toe of SR 410 embankment, side channel downstream of Skookum Falls Overlook. April 25, 2005.

Site 2, MP 51.6. Side channel running along SR 410 embankment downstream of Skookum Falls Overlook. April 25, 2005.
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Site 2, MP 51.6. Side channel running along SR 410 embankment downstream of Skookum Falls Overlook. Engineered logjams and LWD armoring is recommended along toe of slope to keep erosive flows away from highway embankment. April 25, 2005.

Site 2, MP 51.6. Side channel running along SR 410 embankment downstream of Skookum Falls Overlook. Areas of small deciduous trees such as right side of photo should be supplemented with large trees to prevent side channel from approaching highway embankment. April 25, 2005.

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Site 3, MP 55 looking downslope approximately 90 feet from edge of pavement (EOP). Note lack of any woody vegetation on slope and edge of water at toe of slope. Most recent airphoto taken in 1998(?) shows approximately 100 feet of riparian forest between highway and river at this site. Rock riprap covers only upper 20 feet of slope and undercut by eroding slope. April 25, 2005.

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Site 3, MP 55 looking upstream of failing slope. Highway is situated approximately 70 ft above river. River is actively eroding toe of slope. April 25, 2005.

Site 3, MP 55 looking downstream of failing slope. April 25, 2005.

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Site 3, MP 55 looking downstream at slope displacement and tension cracks in highway surface. April 25, 2005.

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Upstream end of Site 4, MP 58.4. Location where river flow across floodplain currently encounters SR 410. Looking downstream (North) where emergency gravel dike separates side channel flow from highway. Water surface is approximately 1 foot above highway surface during low flow conditions. Note submerged trees to the left. April 27, 2005.

Site 4, MP 58. Looking upstream at side channel along SR 410 where on-going erosion threatens highway embankment. April 27, 2005.

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Site 4, MP 58.6 Standing on floodplain east of inlet to side channel where river flow entering forest and flowing down gradient toward SR 410 (flow is left to right). April 27, 2005.

Site 4, MP 58.6 Standing on floodplain north of side channel inlet where river flow entering forest and flowing down gradient toward SR 410 (flow is right to left into photo). April 27, 2005.

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Site 4, MP 58.6 upstream headcut complex downstream of previous two photographs. Looking west from SR 410 near cross-section 7.

Site 4, MP 58.6 river flow across forested floodplain. Note broad area of sedimentation and tree burial.

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Floodplain sedimentation within downstream portion of Site 4, MP 57.

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Site 4, MP 58.4. Side channel head cut near right bank of mainstem White River channel. April 26, 2005.

Site 4, MP 58.4 . Side channel flowing through floodplain forest toward SR 410. April 26, 2005.

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Site 4, MP 58.6. Looking southeast at side channel flow and sedimentation of coarse (cobble) bedload on forested floodplain.

Site 4, MP 58.6. Looking downstream at side channel incision into forested floodplain and example of root cohesion and tree recruitment in preventing entire White River from occupying this low lying area situated up to 15 feet below river bed.

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Site 4, MP 58.6. Looking upstream at overbank flow across forest floodplain cutting side channel and resistance presented by root cohesion and woody debris.

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Site 4, MP 57.6. Illustration of old growth trees (>500 years old) being buried in recent sedimentation. April 27, 2005.

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Upstream of site 4 and 5 at future side channel inlet along SR 410, MP 58.8. April 26, 2005.

Site 6, MP 59. SR 410 highway embankment along mainstem of White River. Flow is from right to left. Note recent bank failure at center of photo. Recent tree recruitment to river at right may help to deflect flows away from road grade, but a series of ELJ structures is recommended to extend armored riparian forest buffer out from highway approximately 30 feet. April 27, 2005.

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Site 7, MP 59.25. Looking downstream at severely undercut tree on eroding high bank along maintenance yard. April 27, 2005.

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SR 410

Site 7, MP 59.25. Looking upstream at eroding high bank along maintenance yard. April 27, 2005.

Site 8, MP 59.3. Low lying segment of SR 410 in White River floodplain. Location of WSDOT cross-section (location of cross-section 3, Figure A-5, Appendix A).