

Technical Memo

WEST Consultants, Inc.
2601 25th St. SE
Suite 450
Salem, OR 97302-1286
(503) 485 5490
(503) 485-5491 Fax
www.westconsultants.com



Name: Kimball Storedahl
Company: J.L. Storedahl & Sons, Inc.
Date: March 14, 2016
From: Hans R. Hadley, P.E.
Senior Hydraulic Engineer



Expires 12/5/16

Subject: MEM-07 Monitoring Report – February 26, 2016 Field Reconnaissance

WEST Consultants conducted the sixth annual field reconnaissance of the East Fork Lewis River in the vicinity of the Daybreak Mine as required under MEM-07 of the Habitat Conservation Plan. The reconnaissance was conducted by Hans R. Hadley P.E. and Thomas R. Grindeland P.E. on February 26, 2016. Observations of the river and floodplain were made to determine the likelihood of the river avulsing into the existing Daybreak ponds. This memo documents the results of that field reconnaissance. The highest discharge that occurred prior to the site visit for winter 2015/2016 was 22,400 cfs which occurred on December 9, 2015. This is the second highest recorded flow in the East Fork Lewis River at the Heisson Gage, second only to the February 1996 flood, and has nearly a 25-year recurrence interval. Photographs of current conditions were taken at identical locations to those taken in November 2011, March 2013, February 2014, and March 2015, utilizing the same location number and photo number. The photograph locations are shown on an aerial photo base map (Appendix A) from June 2015. Arrows are depicted on the map to indicate the direction in which each photo was taken. A corresponding photographic log is provided in Appendix B.

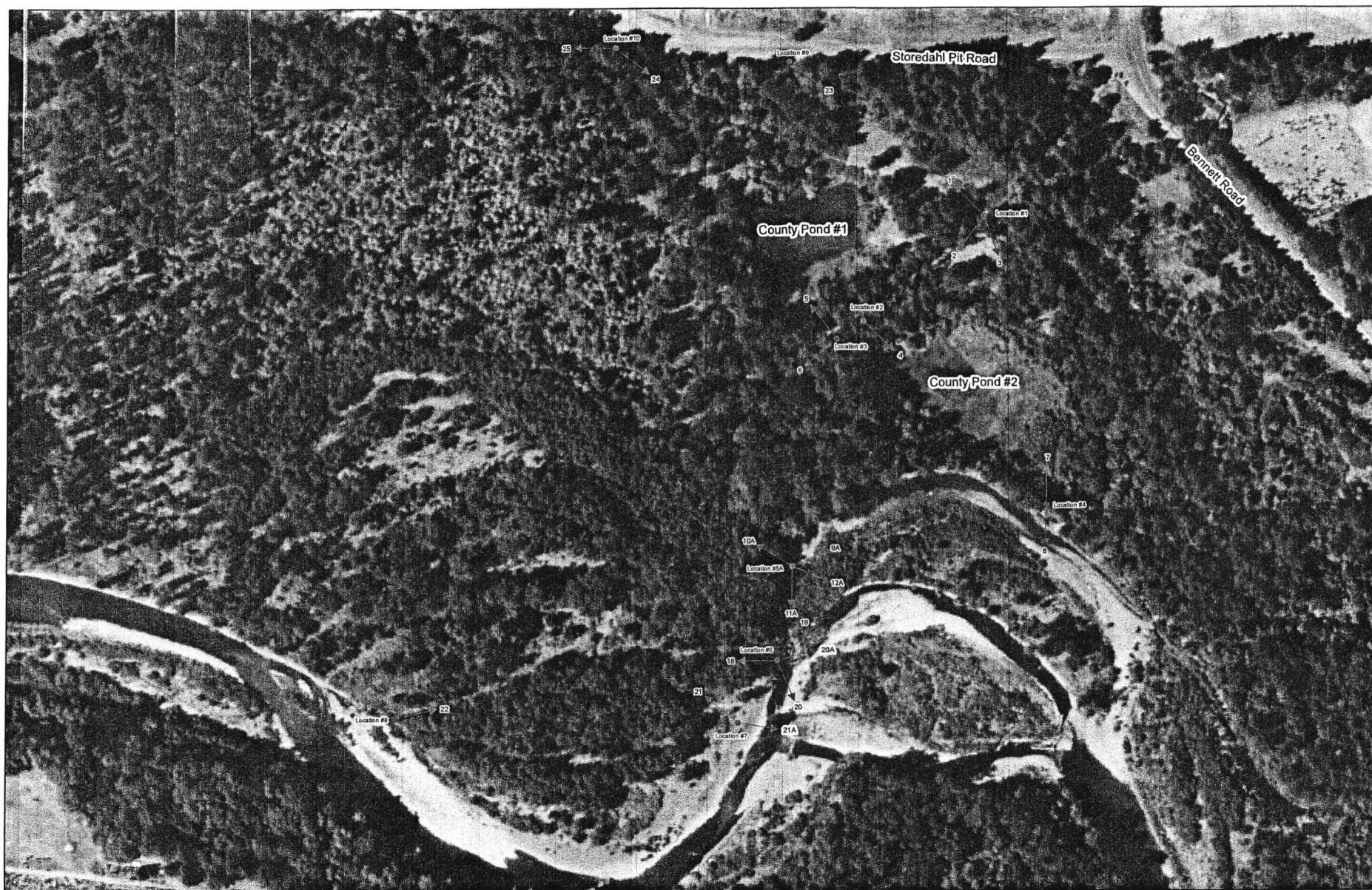
Currently, there are no indications to suggest that the East Fork Lewis River poses an imminent avulsion threat to the Daybreak Ponds. However, observations of erosional and depositional areas in the floodplain suggest that during the nearly 25-year flood in December 2015, secondary flow paths from the main channel were actively transporting water and sediment. Significant deposits of sediment and large woody debris were also observed along the main channel (see Photos 20A and 21A). The main channel continues to be generally located along the southern portion of the valley with large areas of floodplain separating the channel from the Daybreak Ponds. However, observations continue to suggest that several small secondary channels are intermittently active within the floodplain between the main channel and Storedahl Pit Road.

At Location #1, the existing headcut appears to have migrated a short distance further upstream from its observed location in November 2011 (see Photo 3). Indications of bank erosion and

sediment deposition were also observed downstream of the head cut. The secondary channel appears to terminate at County Pond #1 but could pose an avulsion threat in the future and will continue to be monitored for changes in size and extent during subsequent field reconnaissance efforts.

The secondary channel that parallels Storedahl Pit Road was conveying water at the time of the reconnaissance (see Photos 24-28 & 38-39). The flow in the East Fork Lewis River at Heisson was about 750 cfs during this time. During all previous site visits, this channel has been dry. Flow in the East Fork during the previous visits ranged from 135 cfs to 1,250 cfs. This indicates that an increase in the bed elevation of the main channel near the head of the secondary channel and/or changes to the geometry of the head of the secondary channel may have occurred during the December 2015 flood event. This has subsequently resulted in greater amounts of flow entering the secondary channel compared to previous years. The connectivity of this secondary channel with the main channel will continue to be monitored during subsequent field reconnaissance efforts.

Appendix A: Base Map



0 100 200 400 Feet



Photographic Log Base Map (June 2015) - February 26, 2016 Reconnaissance

Sheet 1 of 3



0 100 200 400 Feet
| | | | |



Photographic Log Base Map (June 2015) - February 26, 2016 Reconnaissance

Sheet 2 of 3



0 100 200 400 Feet



Photographic Log Base Map (June 2015) - February 26, 2016 Reconnaissance

Sheet 3 of 3

Appendix B. Photographic Log



Photo 1. Looking northwest from Location #1 along secondary floodplain channel.



Photo 2. Looking southwest from Location #1 at headcut nick point located at upstream end of secondary floodplain channel.



Photo 3. Looking south southeast from Location #1 toward County Pond #2.



Photo 4. Looking southeast from Location #2 at overflow path from County Pond #2.



Photo 5. Looking northwest from Location #3 at overflow channel into County Pond #1.



Photo 6. Looking southwest from Location #3 at headcut nick point located at upstream end of overflow channel into County Pond #1.



Photo 7. Looking north from Location #4 at overflow channel from E.F. Lewis River into County Pond #2.



Photo 8. Looking south from Location #4 at upstream end of overflow channel from E.F. Lewis River into County Pond #2. Recently abandoned E.F. Lewis River channel in background.



Photo 9A. Looking northeast northeast from Location #5A at right bank of recently abandoned section of E.F. Lewis River at location of overflow channel that leads to County Pond #2.



Photo 10A. Looking northwest from Location #5A at upstream end of secondary channel.



Photo 11A. Looking south from Location #5A at downstream end of recently abandoned section of E.F. Lewis River.



Photo 12A. Looking east southeast from Location #5A at downstream end of second E.F. Lewis meander cutoff channel.



Photo 18. Looking west from Location #6 at upstream end of secondary floodplain channel.



Photo 19. Looking north northeast from Location #6 at rock vane located along the right bank of recently abandoned section of E.F. Lewis River.



Photo 20. Looking southeast from Location #6 at downstream end of recently abandoned section of E.F. Lewis River. Note first cutoff channel at left side of photo.



Photo 20A. Looking east northeast from Location #6 at downstream end of second E.F. Lewis River meander cutoff channel.



Photo 21. Looking northwest from Location #7 at upstream end of secondary floodplain channel.



Photo 21A. Looking east southeast from Location #7 at downstream end of first E.F. Lewis River meander cutoff channel.



Photo 22. Looking east northeast from Location #8 at downstream end of secondary floodplain channel.



Photo 23. Looking southeast from Location #9 in direction of floodplain overflow channel shown in Photo 1.



Photo 24. Looking southeast from Location #10 at floodplain adjacent to Storedahl Pit Road. Historic location of E.F. Lewis River channel.



Photo 25. Looking west from Location #10 at floodplain adjacent to Storedahl Pit Road. Historic location of E.F. Lewis River channel.



Photo 26. Looking southeast from Location #11 at floodplain adjacent to Storedahl Pit Road. Historic location of E.F. Lewis River channel.



Photo 27. Looking south from Location #11 at floodplain adjacent to Storedahl Pit Road. Historic location of E.F. Lewis River channel.



Photo 28. Looking west southwest from Location #11 at floodplain adjacent to Storedahl Pit Road. Historic location of E.F. Lewis River channel.



Photo 29. Looking northwest from Location #12 at Daybreak Pond #5 overflow into E.F. Lewis River floodplain.



Photo 30. Looking northeast from Location # 12 at Daybreak Pond #5.



Photo 31. Looking west northwest from Location #12 at E.F. Lewis River floodplain.



Photo 32. Looking west from Location #13 at E.F. Lewis River floodplain.



Photo 33. Looking southeast from Location #13 at E.F. Lewis River floodplain.



Photo 34. Looking south southeast from Location #14 at historic E.F. Lewis River channel.



Photo 35. Looking west from Location #14 at historic E.F. Lewis River channel.



Photo 36. Looking north northeast from Location # 15 along alignment of historic E.F. Lewis River channel.



Photo 37. Looking south southwest from Location #15 along alignment of historic E.F. Lewis River channel.



Photo 38. Looking east southeast from Location #16 at E. F. Lewis River floodplain. Historic location of E.F. Lewis River channel.



Photo 39. Looking west southwest from Location #16 at E.F. Lewis River floodplain. Historic location of E.F. Lewis River channel.