










## APPENDIX B LIBBY CREEK PROJECT OPPORTUNITIES

Reach	Sub-Unit	Project Number	Strategy Category	Project Name	Description	Photo
1	IZ-16	Project RM 0.0	Instream Habitat Enhancement	Confluence Maintenance	A Low flow passage problem currently exists at the confluence of Libby Creek and the Methow River. There is currently a short, steep riffle to connect the base flow elevation of Libby Creek to the base flow water surface elevation of the Methow River. This may present a passage problem for juveniles at low flow. This location should be monitored, and if necessary, grade control should be installed to ensure fish passage at all flows.	
1	IZ-15	Project RM 0.04	Instream Habitat Enhancement	LW Enhancement	This project would include a lateral log-jam along the right bank of the channel. The goal of the wood placement would be to provide adult holding and juvenile rearing habitat. Large wood would promote lateral channel dynamics, recruit spawning gravels, initiate pool scour, and provide cover for habitat. This location benefits from having few infrastructure constraints; this project would also promote overland flow on one of the few connected OZs	
1	DOZ-06	Project RM 0.06 (Left Bank)	Riparian Restoration	Expand Riparian Buffer (left bank).	A very narrow band of riparian forest extends along the left bank. This project would plant high density native riparian forest vegetation within a 150 foot buffer in order to restore riparian functions including stream shade, bank stabilization, and futures sources of LWM.	




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1	IZ-13	Project RM 0. 1	Instream Habitat Enhancement	Monitor Instream Flow & Withdrawal Rates	This project includes monitoring instream flows to ensure flow is meeting the requirements for fish passage and habitat. If necessary, investigate opportunities for reducing withdrawals during low flow periods to increase instream flows.	
1	IZ-10	Project RM 0.12 (Left Bank).	Reconnect Stream Channel Processes	Remove Riprap	This project involves the removal of approximately 75 feet of riprap along the left bank. Riprap removal would restore lateral channel dynamics and would reduce the rate of incision within Libby Creek. A small jam could be placed along the right bank to promote habitat diversity and inundation along the left floodplain.	
1	IZ-03	Project RM 0.15	Instream Habitat Enhancement	LW Enhancement	This project involves placement of large wood to promote channel process and to provide cover for habitat that is extremely limited in this reach. The project would include a lateral bank jam and cover wood along the right bank into existing pool/glide habitat.	




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1	IZ-09	Project RM 0.21-L	Instream Habitat Enhancement	Monitor Instream Flow & Withdrawal Rates	This project includes monitoring instream flows to ensure flow is meeting the requirements for fish passage and habitat. If necessary, investigate opportunities for reducing withdrawals during low flow periods to increase instream flows.	
1	IZ-09	Project RM 0.21-C	Reconnect Stream Channel Processes	Remove Channel Spanning Wood Bridge and Replace with Channel-spanning Log Jam.	The existing channel-spanning wood bridge could be removed and replaced with LW material. A channel-spanning jam could be tied into the banks where the existing bridge abutments are located. This would promote vertical stability of the Libby Creek channel.	
1	IZ-08	Project RM 0.29	Reconnect Stream Channel Processes	Replace Highway 153 Bridge	The existing Highway 153 bridge is undersized – it is currently only equivalent to 1.25 channel widths at low flow. The bridge is acting as a hydraulic constriction and limiting lateral migration of the channel. Additionally, it is causing scour downstream of the bridge. The bridge should be replaced with a wider and higher structure to allow for the lateral and vertical expansion of Libby Creek.	




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1	IZ-07	Project RM 0.3	Reconnect Stream Channel Processes	Riprap Removal & Grade Control	Libby Creek has been channelized and riprap has been placed along both the left and right banks. Riprap begins 40 feet upstream of the Highway 153 Bridge and extends along both banks for 116 feet. This project would include the removal or modification of the riprap to enhance channel margin habitat and to restore lateral channel dynamics. If necessary, wood jams and grade control could be placed to protect property.	
1	IZ-06	Project RM 0.33	Reconnect Stream Channel Processes	Transverse Bar Construction	Instream alterations have been made to create a step-pool sequence. These alterations extend 100 feet upstream of the riprap at RM 0.3. The steps could be removed and replaced with constructed transverse riffles/bars to improve habitat conditions for spawning, rearing, and insect production. This would introduce more lateral movement within the stream and would promote scour pool development. Large wood could be added for habitat enhancement within the pools. It would be necessary to work closely with the landowners to ensure maintenance of aesthetics and adjacent uses.	
1	OZ-03	Project RM 0.38	Reconnect Floodplain Processes	Floodplain Reconnection	The incision of Libby Creek has resulted in extremely limited connected floodplain throughout the survey reach. This location presents adequate space to lower floodplain surfaces on either side and install alternating large wood jams. This would promote increased hydraulic and hydrologic connectivity with floodplain surfaces on either side, as well as provide habitat diversity throughout the reach.	




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1	DOZ-03 and DOZ-01	Project RM 0.41	Reconnect Floodplain Processes	Floodplain Reconnection	The left and right bank throughout this area provide space to lower floodplain elevations to create an active floodplain. Floodplains would be treated with large wood to increase complexity and provide roughness throughout the reach. Large wood would promote gravel recruitment and pool scour over time.	
1	DOZ-03 and DOZ-01	Project RM 0.42	Reconnect Stream Channel Processes	LW Enhancement	This project would be paired with RM 0.41 if possible. This project would include creating alternating channel margin log jams to reintroduce lateral migration into Libby Creek and slow its rate of incision.	
1	IZ-03	Project RM 0.5	Instream Habitat Enhancement	LW Enhancement	This project would involve the placement of two large log jams (one along the right bank at the downstream end, and one along the right bank at the upstream end) that extend out into the channel. This would promote lateral channel dynamics, pool scour, gravel recruitment, and cover enhancement. These actions would be paired with dense plantings of riparian vegetation along both banks.	


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2	DOZ-09	Project RM 0.62	Riparian Restoration	Riparian Restoration (right bank)	Approximately 150 feet of the right bank is unvegetated along this reach. Native replanting would improve shade, natural stability, and provide future sources of large wood.	
2	IZ 17	Project RM 0.7	Instream Habitat Enhancement and Riparian Restoration	LW Enhancement, Riparian Restoration, and Diversion Monitoring	Large wood could be keyed into the right bank to provide overhanging cover, recruit gravels, and promote pool scour. This would be paired with riparian restoration along the right bank to provide shade, natural stability, and future sources of large wood material.	
2	IZ-16	Project RM 0.71	Reconnect Stream Channel Processes	LW Enhancement	Alternating jams would be placed along the left and right banks throughout this long riffle. This would promote lateral migration of the channel as well as initiate gravel recruitment and pool scour. This would provide habitat complexity in this long, uniform riffle.	

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Reach	Sub-Unit	Project Number	Strategy Category	Project Name	Description	Photo
2	IZ-15	Project RM 0.75	Instream Habitat Enhancement	LW Enhancement	A small jam could be built into the right bank along this reach. The goal of the jam would be to add complexity and cover.	
2	IZ-12 and OZ 07	Project RM 0.9	Instream Habitat Enhancement and Reconnect Stream Channel Processes	LW Enhancement and Fill Removal	The location of a connected outer zone (OZ-07) along the left bank makes this an excellent location for a channel- and valley-spanning jam. A large jam complex here would promote floodplain connectivity and habitat complexity. Fill along the floodplain would need to be removed and portions of the floodplain may also need to be regraded. An additional log jam could also be installed along the left bank approximately 100 feet downstream.	
2	DOZ -04	Project RM 1.07	Riparian Restoration	Riparian Restoration	The right bank is sparsely vegetated from RM 1.07 to RM 1.14. The shoreline has been altered, regraded, and cleared for residential development along the banks. This project would replant banks with native riparian seedlings and regrade where necessary.	

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Reach	Sub-Unit	Project Number	Strategy Category	Project Name	Description	Photo
2	IZ-06 and OZ-06	Project RM 1.18	Reconnect Stream Channel Processes	LW Enhancement	The left and right banks throughout this reach are relatively well connected floodplains. Large, alternating, left and right bank jams could be placed to promote lateral channel migration, gravel recruitment, and pool habitat formation.	
2	IZ-02 and IZ-03	Project RM 1.35	Reconnect Stream Channel Processes	Bridge Replacement	The left and right abutments of this bridge are limiting Libby Creek's lateral channel dynamics and are acting as a hydraulic constriction. Replacing the bridge with a larger bridge would restore channel processes.	