

APPENDIX E.3.3
***TECHNICAL MEMORANDUM
FOR RIPARIAN VEGETATION STUDY***

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1.0 Introduction

Riparian Study

Purpose of Study

To characterize the riparian vegetation within the Project boundaries

2.0 Study Methods

1. Riparian vegetation was mapped initially in GIS on aerial images of the project area. Existing vegetation maps for the area were referenced in this step (Okanogan County Public Utility District 1991).
2. Riparian vegetation was characterized in July 2006, in conjunction with other botanical studies.
3. The riparian vegetation was described, and its distribution and width was mapped. Data included the species composition, an estimate of the percent cover, the height of the vegetation, and mortality, if any. Map polygons were a minimum of 0.25 acre in size. Additionally, the surveyors recorded the presence/absence of seedlings and young saplings in polygons with tree species.
4. Surveys were conducted in areas that the District owns or for which the District obtained access permission from local property owners and agencies and that could be accessed safely. Areas unsafe for access included steep cliffs, unstable slopes, and areas bounded by impassable stream conditions
5. The results of the riparian surveys identify the distribution, community types, and condition of riparian vegetation observed within the Enloe Dam project area. Riparian vegetation descriptions include the species composition, an estimate of the percent cover, the height of the vegetation, mortality (if any), and presence or absence of tree seedlings and young saplings in areas where trees are present.

3.0 Results

Riparian forest in the project area consists of stands of woody vegetation from 12 to 80 feet tall. The largest stand is on the east bank of the river at Enloe Dam. The dominant tree in this community is black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), but quaking aspen (*Populus tremuloides*) and water birch (*Betula occidentalis*) contribute to overstory canopy in some areas. Common understory trees and shrubs include willow (*Salix* spp.), red-osier dogwood (*Cornus sericea* = *C. stolonifera*), chokecherry (*Prunus virginiana*), black hawthorn (*Crataegus douglasii*), Rocky Mountain maple (*Acer glabrum*), and mountain alder (*Alnus incana*). Common herbaceous species include clematis (*Clematis* spp.), rushes (*Juncus* spp.), sedges (*Carex* spp.), and horsetail (*Equisetum* spp.). Stands of riparian forest on the east side of the river have been burned since 1991. Many of the larger black cottonwoods are at least partly dead, although resprouting is occurring.

The riparian shrub community consists of woody vegetation that is less than 12 feet tall. The widest areas with this community are found primarily along the east bank of reservoir, but it also occurs as a narrow fringe elsewhere along the reservoir. Willow stands, varying in size from bands of seedlings or small shrubs to large dense thickets, provide over 75 percent of the total shrub canopy cover. The dominant willow species are Bebb willow (*Salix bebbiana*) and yellow willow (*Salix rigida*). Other species in this community include red-osier dogwood, chokecherry, clematis, smooth sumac, and young black cottonwoods.

The herbaceous wetland community is found on wet or seasonally flooded areas and occurs in scattered patches on low-elevation terraces immediately adjacent to the reservoir. Dominant species are perennial grasses, including reed canary grass (*Phalaris arundinacea*) and bluegrass. Other species include cattail (*Typha* spp.), horsetail, milkweed (*Asclepias* spp.), and knapweed. Woody species found in these areas include Wood's rose, red-osier dogweed, black hawthorn and willow, but provide less than five percent of the cover in this community.

4.0 References

Public Utility District No. 1 of Okanogan County (PUD). 1991. Application for License for Major Unconstructed Project, Enloe Hydroelectric Project, Project No. 10536. Okanogan Washington, June 1991.

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Riparian Vegetation in the Project Area

Reach ID	Percent Cover-Woody	Percent Cover-Herbaceous	Mortality (%)	Length (ft)	Width (ft)	Species Name	Height (ft)	Comment
W-1	90	50		550	10	<i>Salix bebbiana</i>	10-12	
						<i>Scrub</i>		
W-2	60	100		1125	8-25	<i>Salix bebbiana</i>	12	
						<i>miscellaneous grasses</i>		
						<i>Juncus spp.</i>		
W-3	10			1205	10	<i>miscellaneous grasses</i>		Occasional willow and alder shoots
						<i>Salix bebbiana</i>		
						<i>Carex spp.</i>		
						<i>Eleocharis sp.</i>		
						<i>Salix rigida</i>		
						<i>Alnus incana</i>		
						<i>Betula spp.</i>		
<i>Cornus sericea</i>								
W-4		90		463	5-33	<i>miscellaneous grasses</i>		Willow shoots
						<i>Salix sp.</i>		
						<i>Juncus spp.</i>		
W-5	5	90		477	10	<i>Salix spp.</i>	4	
W-6	30			1404	17	<i>Betula spp.</i>	40	Part of this stand is outside the FERC boundary
						<i>Amelanchier spp.</i>	10	
						<i>miscellaneous grasses</i>		
W-7				447	1-68	<i>Juncus spp.</i>		
						<i>Betula occidentalis</i>		
						<i>Euthamia occidentalis</i>		
W-8	30	100		115	5-8	<i>Salix bebbiana</i>	4	
W-9	40			517	6-55	<i>Equisetum spp.</i>		

Reach ID	Percent Cover-Woody	Percent Cover-Herbaceous	Mortality (%)	Length (ft)	Width (ft)	Species Name	Height (ft)	Comment
						<i>miscellaneous grasses</i>		
						<i>Salix spp.</i>	4	
W-10		30		253	14	<i>Salix bebbiana</i>	2	
						<i>Equisetum spp.</i>		
E-1		50		67	7	<i>Equisetum spp.</i>		
						<i>Xanthium strumarium</i>		
						<i>Salix bebbiana</i>	2	
E-2		20		570	2-10	<i>Salix bebbiana</i>	3	
						<i>Equisetum spp.</i>		
E-3		30		188	7	<i>Salix bebbiana</i>		
						<i>Amelanchier spp.</i>		
E-4		50		643	3-4	<i>Equisetum spp.</i>	10	Scattered willow seedlings
						<i>Salix bebbiana</i>		
E-5		50		187	Face of bank	<i>Equisetum spp.</i>		
						<i>Rhus radicans</i>		
						<i>Linaria vulgaris</i>		
						miscellaneous grasses		
ED-1	90	100	<1	170	1-92	<i>Cornus sericea</i>	8-10	
						<i>Rhus radicans</i>		
ED-2	70	100		595	105-245	<i>Acer glabrum</i>	35	
						<i>Populus balsamifera</i>	50	
						<i>Equisetum spp.</i>		
						miscellaneous grasses		
ED-3	70	100	25	86	39	<i>Populus balsamifera</i>		3 total Populus trees, 1 dead
						<i>Rosa woodsii</i>		
						miscellaneous grasses		

Reach ID	Percent Cover-Woody	Percent Cover-Herbaceous	Mortality (%)	Length (ft)	Width (ft)	Species Name	Height (ft)	Comment
ED-4	50	100		233	50	<i>Cornus sericea</i>		Willow and cottonwood resprouts.
						<i>Betula occidentalis</i>	15	
						<i>Populus balsamifera</i>	30	
						<i>Rosa woodsii</i>		
						miscellaneous grasses		
						<i>Salix bebbiana</i>	6	
ED-5	75			239	11	<i>Cornus sericea</i>	6	
						<i>Salix spp.</i>		
ED-6	70		5	209	40	<i>Betula spp.</i>	20	Beaver trimmed tree branches
						<i>Cornus sericea</i>		
						<i>Rosa woodsii</i>		
ED-7		90	5	985	10-116	<i>Populus balsamifera</i>	50	Cottonwood resprouting form beaver trimming
						<i>Salix bebbiana</i>	5-10	
						<i>Cornus sericea</i>	4-8	
ED-7b				553	18	<i>Salix bebbiana</i>		
						<i>Cornus sericea</i>		
ED-8		90	5	62	35	<i>Populus balsamifera</i>	50	Beaver cut stumps
						<i>Betula spp.</i>	30	
						<i>Populus balsamifera</i>	12	
						<i>Rhus glabra</i>		
						miscellaneous grasses		
						<i>Rhus radicans</i>		
ED-9	25	90	1	324	25	<i>Cornus sericea</i>	10	

Reach ID	Percent Cover-Woody	Percent Cover-Herbaceous	Mortality (%)	Length (ft)	Width (ft)	Species Name	Height (ft)	Comment
						<i>Salix bebbiana</i>	10	
ED-10	25	90	1	575	52	<i>Cornus sericea</i>	10	
						<i>Salix bebbiana</i>	10	
ED-11		10-100	5-10	1194	155	<i>Cornus sericea</i>	4	Possible fire damage and death with resprouting
						<i>Salix bebbiana</i>	4	
						<i>Acer glabrum</i>		
						<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	30	
West Side, downstream of Dam	90			910	30-95	<i>Acer glabrum</i>	10	Minor die back in one serviceberry
						<i>Pseudotsuga menziesii</i>		
						<i>Populus balsamifera</i>	60	
						<i>Amelanchier</i> sp.	15	
						<i>Salix bebbiana</i>		
East Side, downstream of Dam	35	65		63	30	<i>Salix bebbiana</i>	4	
						miscellaneous grasses		