Supplementary material for GSA Data Repository:

Initial random coordinates were generated according to uniform distributions within the valley fills of the upper and lower reaches, respectively. For each reach, initial points that fell outside the surveyed geometry of the fill were discarded. Longitudinal (downstream) coordinates were restricted to surveyed cross-sections. Lateral (cross-valley) coordinates had to lie within the measured valley width. Vertical (height above bedrock) coordinates had to fall below the surface of the fill. The first 30 generated points that fell within the fill of each reach were accepted and used to determine the actual sampling locations, which were then determined by substituting positions of the right or left banks (with equal probability unless only one of the banks was high enough) for the lateral coordinates. The number of sampling points was that deemed necessary to robustly characterize the respective distributions (a "large number"). Because that number is the same regardless of the volume, the upper reach, with a lower total volume, was sampled more densely than the lower reach.

Details of the radiocarbon dating, including calibrated age ranges, are shown in Table 1.

Note that, according to Gavin (2001), age estimates may reflect "inbuilt ages" of as much as 600 years due to the longevity of trees in the Pacific Northwest. That is, wood from the center of a 600-year-old tree will, upon sampling, produce an age estimate of at least 600 years, which is its inbuilt age.

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TABLE 1. RADIOCARBON SAMPLES, LOCATIONS, CHARACTERISTICS, AGES, AND CALENDAR DATES

R*	Station	Dist.† (m)	B§	Height# (m)	Facies**	Mat.††	Meth.§§	Mass (g)	Lab Number	Radiocarbon age ± 1σ##	Calibrated age range (1σ)***
L	BC-1	44	R	0.45	FG	dw	INF	0.33		60 ± 50	1696– 1918 AD
	BC-2	147	R	1.7	DF	dc	AMS	0.23	AA57073	410 ± 34	1440– 1611 AD
	BC-3	147	L	0.3	FG	dc	AMS	0.29	AA57074	1970 ± 36	19 BC– 73 AD
	BC-4	94	L	0.8	FF	dc	AMS	1.13	AA57075	179 ± 30	1668– 1952 AD
	BC-5	236	R	1.3	DF	dc	AMS	0.12	AA57076	1706 ± 27	262– 389 AD
	BC-6	294	L	0.01	FG	sl br	BD	60.48	B184181	130 ± 50	1682– 1938 AD
	BC-7	430	R	1.7	DF	dc	AMS	0.27	AA57077	1056 ± 29	973– 1020 AD
	BC-8	429	L	0.8	FG	dc	AMS	0.45	AA57078	205 ± 30	1655– 1953 AD
	BC-9	473	R	2.5	DF	dc	AMS	0.15	AA57079	1044 ± 32	980– 1023 AD
	BC-10	473	R	0.7	FG	dc	AMS	0.01	AA57080	2334 ± 33	412– 375 BC
	BC-11	533	L	0.7	FF	dc	AMS	0.26	AA57081	3401 ± 33	1741– 1664 BC
	BC-12	533	L	2.1	FF	dc	AMS	0.26	AA57082	2913 ± 32	1190– 1045 BC
	BC-13	640	R	1	DF	dw	AMS	2	AA57083	437 ± 29	1433– 1464 AD
	BC-14	700	R	1.0	DF	W	BD	29.89	B184182	450 ± 50	1415– 1482 AD
	BC-15	700	L	1.2	FF	wb	BD	26.95	B184183	110 ± 50	1688– 1927 AD
	BC-16	700	L	0.2	FG	sl br	BD	38.5	B184184	130 ± 50	1682– 1938 AD
	BC-17	727	L	1.2	DF	dc	AMS	0.33	AA57084	1474 ± 29	563– 621 AD
	BC-18	731	L	2.2	DF	dc	AMS	0.14	AA57085	1877 ± 31	77– 210 AD
	BC-19	727	R	0.5	DF	dc	AMS	0.12	AA57086	816 ± 30	1211– 1262 AD
	BC-20	789	L	0.2	FF	dc	AMS	0.8	AA57087	3769 ± 30	2273– 2138 BC
	BC-21	858	R	0.25	FF	sl br	BD	20.91	B184185	370 ± 50	1453– 1626 AD
	BC-22	894	R	0.7	FF	dc	AMS	0.34	AA57088	201 ± 44	1652– 1953 AD
	BC-23	1101	R	0	FG	wb	BD	54.14	B184186	180 ± 50	1661– 1953 AD
	BC-24	971	L	1.5	FF	dc	AMS	0.39	AA57089	2491 ± 25	758– 544 BC
	BC-25	959	R	1.7	DF	dc	AMS	0.04	AA57090	2670 ± 27	836– 801 BC
	BC-26	94	L	0.3	FG	dc	AMS	0.02	AA57091	4447 ± 40	3314– 2942 BC
	BC-27	46	R	0.25	FG	w	BD	147.61	B184187	60 ± 50	1696– 1918 AD
	BC-28	1100	R	0.5	FG	br	INF	3.08		180 ± 50	1661– 1953 AD
	BC-29	94	L	1	FF	dw	INF	2.9		179 ± 30	1668– 1952 AD
	BC-30	538	R	0.15	FG	dc	AMS	0.15	AA57092	1267 ± 31	690– 772 AD
U	BC-31	1298	L	0.5	FG	dw	AMS	3.51	AA57093	103.88 ± 0.37*	1956– 1957 AD
	BC-32	1365	L	0.8	DF	dc	AMS	0.17	AA57094	402 ± 31	1444– 1611 AD
	BC-33	1365	L	1.5	DF	dc	AMS	0.08	AA57095	1532 ± 31	440– 576 AD
	BC-34	1365	L	3.1	DF	dc	AMS	0.45	AA57096	1128 ± 31	889– 971 AD
	BC-35	1365	R	0.6	DF	dw	AMS	0.25	AA57097	623 ± 34	1297– 1393 AD
	BC-36	1405	R	0.6	DF	dc	AMS	0.02	AA57098	2443 ± 33	731– 413 BC
	BC-37	1405	L	3.8	DF	dc	AMS	0.05	AA57099	655 ± 30	1286– 1387 AD
	BC-38	1496	R	1	DF	dc	AMS	0.04	AA57100	213 ± 30	1650– 1953 AD
	BC-39	1496	R	1.7	DF	dc	INF	0.03		213 ± 30	1650– 1953 AD
	BC-40	1499	R	0.7	DF	dc	INF	0.04		213 ± 30	1650– 1953 AD
	BC-41	1485	R	0.1	DF	dc	INF	0.04		213 ± 30	1650– 1953 AD
	BC-42	1492	R	1	DF	dc	INF	0.02		213 ± 30	1650– 1953 AD
	BC-43	1496	R	2.5	DF	dc	AMS	0.02	AA57101	3741 ± 35	2200– 2050 BC
	BC-44	1541	L	1.5	DF	dc	AMS	0.01	AA57102	167 ± 30	1668– 1950 AD
	BC-45	1541	L	2.5	DF	sl br	INF	7.45		167 ± 30	1668– 1950 AD
	BC-46	1597	R	1	DF	dw	AMS	2.37	AA57103	126 ± 30	1684– 1931 AD
	BC-47	1597	R	1.3	DF	w	INF	9.24		126 ± 30	1684– 1931 AD
	BC-48	1600	R	1	DF	dc	INF	0.06		126 ± 30	1684– 1931 AD
	BC-49	1884	R	1	DF	w	AMS	5.15	AA57104	119.94 ± 0.44*	1985– 1988 AD
	BC-50	1922	R	0.7	DF	br	BD	50.68	B184188	116.99 ± 0.65*	1958– 1990 AD
	BC-51	2000	R	1.7	DF	sl br	AMS	6.85	AA57105	437 ± 41	1426– 1481 AD
	BC-52	2000	L	0.1	DF	br	BD	15.35	B184189	111.78 ± 0.78*	1958– 1997 AD
	BC-53	2029	L	1	DF	wb	BD	11.75	B184190	40 ± 60	1696– 1919 AD
	BC-54	2572	R	2.4	DF	sl br	BD	133.64	B184191	510 ± 50	1330– 1445 AD
	BC-55	1667	R	0.55	DF	sv	INF	N/A		N/A	1996– 1997 AD
	BC-56	1667	R	1.5	DF	sv	INF	N/A		N/A	1996– 1997 AD
	BC-57	1667	L	0.16	DF	sv	INF	N/A		N/A	1996– 1997 AD
	BC-58	1667	L	0.21	DF	sv	INF	N/A		N/A	1996– 1997 AD
	BC-59	1714	R	0.41	DF	sv	INF	N/A		N/A	1996– 1997 AD
	BC-60	1714	R	0.93	DF	sv	INF	N/A		N/A	1996– 1997 AD

* R = valley reach of sample location; L = lower reach; U = upper reach.

† Dist. = sample location's distance upstream from outlet.

§ B = bank from which sample was taken; R = right bank; L = left bank.

Height above bedrock-sediment interface.

** Facies from which samples were taken; DF = debris-flow deposit; FF = fluvially deposited fines; FG = coarse fluvial gravel.

†† Mat. = material from which age estimate was derived; dw = detrital wood; dc = detrital charcoal; w = wood; sl br = streamlined wood branch; br = branch; wb = wood bark; sv = surface vegetation (no sample taken from massive, unincised deposit; age derived from apparent age of surface vegetation).

§§ Meth. = method by which age estimate derived; AMS = age determination by accelerator mass spectrometry at NSF-University of Arizona Accelerator Mass Spectrometer Facility, BD = beta decay counting by Beta Analytic; INF = inference on the basis of relative stratigraphic position.

Ages are radiocarbon years before present (1950 AD) with one standard deviation calculated error based on combined measurements of the sample, background and modern reference standards except "*" denotes post-bomb (post-1950 AD) results in percent modern radiocarbon.

*** Calibrated ages given in 1-σ ranges (68.2% probability) of calendar dates obtained from IntCal04 calibration curve (Reimer et al., 2004) for pre-1950 AD and Bomb04NH1 (Hua and Barbetti, 2004) for post-1950 AD radiocarbon ages.