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Table S1. Within site effects on soil C stock in CHR by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	C stock = Distance + Species	(Intercept)	3.75	2.4	1.6	0.125
		Distance	0.01	0.2	0.0	0.962
		Species Douglas-fir	4.94	2.7	1.8	0.079
0–5 cm	C stock = Distance + Species	(Intercept)	21.01	1.2	17.4	<0.001
		Distance	–0.05	0.1	–0.4	0.682
		Species Douglas-fir	0.23	1.4	0.2	0.871
5–10 cm	C Stock = Distance + Species	(Intercept)	14.93	0.7	22.1	<0.001
		Distance	–0.21	0.1	–3.3	0.002
		Species Douglas-fir	–0.13	0.8	–0.2	0.864
10–20 cm	C stock = Distance + Species	(Intercept)	22.56	0.7	32.5	<0.001
		Distance	–0.10	0.1	–1.5	0.148
		Species Douglas-fir	0.52	0.8	0.7	0.515
FF + 0–20 cm	C stock = Distance + Species	(Intercept)	62.25	2.7	23.2	<0.001
		Distance	–0.34	0.2	–1.4	0.184
		Species Douglas-fir	5.56	3.1	1.8	0.079

Table S2. Within site effects on soil C stock in LØV by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	C stock = Distance + Species	(Intercept)	9.86	1.1	9.0	<0.001
		Distance	0.18	0.1	1.8	0.085
		Species Douglas-fir	1.67	1.3	1.3	0.192
0–5 cm	C stock = Distance + Species	(Intercept)	14.30	1.0	14.8	<0.001
		Distance	0.09	0.1	1.0	0.334
		Species Douglas-fir	1.10	1.1	1.0	0.326
5–10 cm	C stock = Distance + Species	(Intercept)	8.55	0.4	22.7	<0.001
		Distance	0.00	0.0	0.1	0.918
		Species Douglas-fir	–0.78	0.4	–1.8	0.078
10–20 cm	C stock = Distance + Species	(Intercept)	13.18	0.7	20.0	<0.001

		Distance	0.15	0.1	2.4	0.023
		Species Douglas-fir	–0.37	0.8	–0.5	0.623
FF + 0–20 cm	C stock = Distance × Species	(Intercept)	48.50	2.4	20.6	<0.001
		Distance	0.00	0.3	0.0	0.986
		Species Douglas-fir	–3.59	3.3	–1.1	0.288
		Distance: Species Douglas-fir	0.82	0.4	2.2	0.036

Table S3. Within site effects on soil N stock in CHR by soil layers.

Soil Layer	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	N stock = Distance + Species	(Intercept)	0.07	0.1	1.4	0.186
		Distance	0	0	0.4	0.704
		Species Douglas-fir	0.09	0.1	1.5	0.138
0–5 cm	N stock = Distance + Species	(Intercept)	1.45	0.1	22.7	<0.001
		Distance	0	0	–0.1	0.942
		Species Douglas-fir	–0.06	0.1	–0.8	0.426
5–10 cm	N stock = Distance + Species	(Intercept)	1.19	0	32.6	<0.001
		Distance	–0.01	0	–3.2	0.003
		Species Douglas-fir	–0.01	0	–0.2	0.813
10–20 cm	N stock = Distance + Species	(Intercept)	2.07	0.1	31	<0.001
		Distance	–0.01	0	–0.9	0.394
		Species Douglas-fir	0.06	0.1	0.8	0.434
FF + 0–20 cm	N stock = Distance + Species	(Intercept)	4.79	0.1	36.9	<0.001
		Distance	–0.02	0	–1.3	0.204
		Species Douglas-fir	0.09	0.1	0.6	0.529

Table S4. Within site effects on soil N stock in LØV by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	N stock = Distance + Species	(Intercept)	0.21	0.0	7.3	<0.001
		Distance	0.01	0.0	2.5	0.019
		Species Douglas-fir	0.06	0.0	2.0	0.059
0–5 cm	N stock = Distance × Species	(Intercept)	0.87	0.0	18.9	<0.001
		Distance	0.00	0.0	0.5	0.633
		Species Douglas-fir	0.00	0.1	0.1	0.958
5–10 cm	N stock = Distance + Species	(Intercept)	0.59	0.0	12.0	<0.001
		Distance	0.00	0.0	0.0	0.976
		Species Douglas-fir	–0.07	0.1	–1.3	0.200
10–20 cm	N stock = Distance + Species	(Intercept)	0.86	0.0	19.2	<0.001
		Distance	0.01	0.0	2.1	0.043
		Species Douglas-fir	0.04	0.1	0.7	0.461
FF + 0–20 cm	N stock = Distance × Species	(Intercept)	2.63	0.1	22.4	<0.001
		Distance	0.00	0.0	0.0	0.980
		Species Douglas-fir	–0.17	0.2	–1.0	0.307
		Distance: Species Douglas-fir	0.03	0.0	1.8	0.078

Table S5. Within site effects on soil C/N ratio in CHR by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	C/N= Distance + Species	(Intercept)	61.3	3.2	19.2	<0.001
		Distance	–0.5	0.3	–1.8	0.079
		Species Douglas-fir	–2.0	3.7	–0.5	0.597
0–5 cm	C/N= Distance + Species	(Intercept)	14.48	0.4	37.0	<0.001
		Distance	–0.03	0.0	–0.7	0.475
		Species Douglas-fir	0.70	0.4	1.6	0.128
5–10 cm	C/N= Distance + Species	(Intercept)	12.47	0.4	32.2	<0.001
		Distance	–0.06	0.0	–1.7	0.093
		Species Douglas-fir	–0.04	0.4	–0.1	0.936
10–20 cm	C/N= Distance × Species	(Intercept)	10.76	0.1	90.6	<0.001

		Distance	0.01	0.0	0.6	0.558
		Species Douglas-fir	0.23	0.2	1.4	0.174
		Distance: Species Douglas-fir	–0.05	0.0	–2.6	0.015
FF + 0–20 cm	C/N= Distance + Species	(Intercept)	13.01	0.3	37.9	<0.001
		Distance	–0.03	0.0	–0.8	0.422
		Species Douglas-fir	0.88	0.4	2.2	0.033

Table S6. Within site effects on soil C/N ratio in LØV by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	C/N= Distance + Species	(Intercept)	45.57	1.1	42.5	<0.001
		Distance	–0.28	0.1	–2.8	0.009
		Species Douglas-fir	–2.59	1.2	–2.1	0.042
0–5 cm	C/N= Distance × Species	(Intercept)	16.74	0.3	49.3	<0.001
		Distance	0.01	0.0	0.2	0.809
		Species Douglas-fir	0.46	0.5	1.0	0.348
		Distance: Species Douglas-fir	0.10	0.1	1.8	0.081
5–10 cm	C/N= Distance + Species	(Intercept)	15.36	0.6	26.4	<0.001
		Distance	0.02	0.1	0.3	0.781
		Species Douglas-fir	–0.24	0.7	–0.4	0.723
10–20 cm	C/N= Distance × Species	(Intercept)	14.78	0.2	66.6	<0.001
		Distance	0.09	0.0	3.7	0.001
		Species Douglas-fir	–0.04	0.3	–0.1	0.903
		Distance: Species Douglas-fir	–0.15	0.0	–4.1	<0.001
FF + 0–20 cm	C/N= Distance + Species	(Intercept)	18.25	0.4	50.4	<0.001
		Distance	0.03	0.0	1.0	0.314
		Species Douglas-fir	0.27	0.4	0.6	0.525

Table S7. Within site effects on soil pH in CHR by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	pH = Distance + Species	(Intercept)	5.3	0.1	71.5	<0.001
		Distance	0.0	0.0	0.9	0.368

		Species Douglas-fir	–0.6	0.1	–6.5	<0.001
0–5 cm	pH = Distance + Species	(Intercept)	4.65	0.13	34.90	<0.001
		Distance	–0.01	0.01	–0.46	0.651
		Species Douglas-fir	–0.48	0.15	–3.13	0.004
5–10 cm	pH = Distance + Species	(Intercept)	4.45	0.08	54.30	<0.001
		Distance	0.00	0.01	0.62	0.542
		Species Douglas-fir	0.02	0.09	0.21	0.837
10–20 cm	pH = Distance + Species	(Intercept)	4.80	0.07	68.40	<0.001
		Distance	0.02	0.01	2.37	0.024
		Species Douglas-fir	0.21	0.08	2.62	0.013

Table S8. Within site effects on soil pH in LØV by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	pH = Distance × Species	(Intercept)	4.81	0.06	84.79	<0.001
		Distance	0.00	0.01	0.19	0.848
		Species Douglas-fir	0.08	0.08	1.01	0.320
		Distance: Species Douglas-fir	–0.02	0.01	–2.75	0.010
0–5 cm	pH = Distance × Species	(Intercept)	3.89	0.06	66.99	<0.001
		Distance	0.00	0.01	–0.19	0.848
		Species Douglas-fir	0.09	0.08	1.12	0.272
		Distance: Species Douglas-fir	–0.02	0.01	–2.59	0.015
5–10 cm	pH = Distance + Species	(Intercept)	3.95	0.03	116.39	<0.001
		Distance	–0.01	0.00	–2.03	0.051
		Species Douglas-fir	0.06	0.04	1.49	0.147
10–20 cm	pH = Distance × Species	(Intercept)	4.07	0.04	104.45	<0.001
		Distance	0.00	0.00	0.18	0.858
		Species Douglas-fir	0.12	0.06	2.24	0.033
		Distance: Species Douglas-fir	–0.01	0.01	–1.84	0.075

Table S9. Across site effects on soil C stock by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	log (C stock) = Distance + Site + Species+ Transect	(Intercept)	1.23	0.1	8.8	<0.001
		Site LØV	0.89	0.1	7.8	<0.001
		Species Douglas-fir	0.28	0.1	2.4	0.017
		Distance	0.01	0.0	1.2	0.233
		Transect_T2	0.17	0.1	1.2	0.233
		Transect_T3	0.11	0.1	0.8	0.420
0–5 cm	log (C stock) = Distance + Site + Species +Transect	(Intercept)	2.96	0.1	51.3	<0.001
		Site LØV	0.00	0.0	0.4	0.680
		Species Douglas-fir	–0.31	0.0	–6.5	<0.001
		Distance	0.03	0.0	0.6	0.556
		Transect_T2	0.05	0.1	0.8	0.399
		Transect_T3	0.06	0.1	1.1	0.289
5–10 cm	log (C stock) = Distance × Site + Species + Transect	(Intercept)	14.65	0.6	25.0	<0.001
		Site LØV	–6.70	0.6	–10.7	<0.001
		Species Douglas-fir	–0.46	0.4	–1.0	0.300
		Distance	–0.21	0.1	–4.1	<0.001
		Transect_T2	0.45	0.5	0.8	0.401
		Transect_T3	0.89	0.5	1.7	0.103
		Site LØV: Distance	0.21	0.1	3.0	0.004
10–20 cm	C stock = Distance × Site + Species + Transect	(Intercept)	22.53	0.7	31.0	<0.001
		Site LØV	–9.83	0.8	–12.6	<0.001
		Species Douglas-fir	0.07	0.5	0.1	0.892
		Distance	–0.10	0.1	–1.5	0.133
		Transect_T2	0.79	0.7	1.2	0.244
		Transect_T3	–0.03	0.7	0.0	0.968
		Site LØV: Distance	0.24	0.1	2.7	0.008
FF + 0–20 cm	log (C stock) = Distance × Site + Species + Transect	(Intercept)	60.89	2.6	23.4	<0.001
		Site LØV	–18.33	2.8	–6.6	<0.001
		Species Douglas-fir	3.59	2.0	1.8	0.070
		Distance	–0.34	0.2	–1.5	0.136
		Transect_T2	3.85	2.4	1.6	0.112
		Transect_T3	3.18	2.4	1.3	0.187
		Site LØV: Distance	0.75	0.3	2.4	0.020

Table S10. Across site effects on soil N stock by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	log (N stock) = Distance + Site + Species + Transect	(Intercept)	–2.89	0.2	–17.9	<0.001
		Site LØV	1.17	0.1	8.9	<0.001
		Species Douglas-fir	0.30	0.1	2.3	0.026
		Distance	0.02	0.0	1.9	0.065
		Transect_T2	0.25	0.2	1.6	0.119
		Transect_T3	0.11	0.2	0.7	0.481
0–5 cm	log (N stock) = Distance × Site + Species + Transect	(Intercept)	0.33	0.0	7.0	<0.001
		Site LØV	–0.47	0.0	–12.5	<0.001
		Species Douglas-fir	–0.03	0.0	–0.7	0.504
		Distance	0.00	0.0	0.2	0.817
		Transect_T2	0.03	0.0	0.7	0.466
		Transect_T3	0.03	0.0	0.6	0.584
5–10 cm	log (N stock) = Distance × Site + Species + Transect	(Intercept)	0.65	0.0	14.4	<0.001
		Site LØV	–0.80	0.0	–21.9	<0.001
		Species Douglas-fir	0.04	0.0	1.1	0.255
		Distance	0.00	0.0	1.2	0.225
		Transect_T2	0.07	0.0	1.6	0.121
		Transect_T3	0.00	0.0	0.1	0.957
10–20 cm	log (N stock) = Distance × Site + Species + Transect	(Intercept)	2.00	0.1	34.8	<0.001
		Site LØV	–1.13	0.0	–24.2	<0.001
		Species Douglas-fir	0.05	0.0	1.1	0.293
		Distance	0.00	0.0	0.5	0.653
		Transect_T2	0.08	0.1	1.3	0.191
		Transect_T3	0.03	0.1	0.5	0.617
FF + 0–20 cm	log (N stock) = Distance × Site + Species + Transect	(Intercept)	1.53	0.0	42.8	<0.001
		Site LØV	–0.65	0.0	–16.8	<0.001
		Species Douglas-fir	0.02	0.0	0.7	0.466
		Distance	0.00	0.0	–1.1	0.265
		Transect_T2	0.07	0.0	2.2	0.034
		Transect_T3	0.02	0.0	0.5	0.597
		Site LØV: Distance	0.01	0.0	2.2	0.028

Table S11. Across site effects on soil C/N ratio by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	C/N = Distance + Site + Species + Transect	(Intercept)	61.70	2.3	26.6	<0.001
		Site LØV	–14.42	1.9	–7.6	<0.001
		Species Douglas-fir	–2.27	1.9	–1.2	0.233
		Distance	–0.41	0.2	–2.7	0.010
		Transect_T2	–3.52	2.3	–1.5	0.133
		Transect_T3	0.37	2.3	0.2	0.875
0–5 cm	C/N = Distance × Site + Species + Transect	(Intercept)	14.13	0.4	37.9	<0.001
		Site LØV	2.13	0.4	5.3	<0.001
		Species Douglas-fir	0.89	0.3	3.2	0.002
		Distance	–0.03	0.0	–0.8	0.416
		Transect_T2	0.19	0.3	0.6	0.575
		Transect_T3	0.58	0.3	1.7	0.094
		Site LØV: Distance	0.08	0.0	1.9	0.067
5–10 cm	C/N = Distance + Site + Species + Transect	(Intercept)	12.32	0.5	25.1	<0.001
		Site LØV	3.28	0.4	8.2	<0.001
		Species Douglas-fir	–0.14	0.4	–0.3	0.733
		Distance	–0.02	0.0	–0.7	0.471
		Transect_T2	–0.38	0.5	–0.8	0.443
		Transect_T3	0.25	0.5	0.5	0.619
10–20 cm	C/N = Distance × Site + Species + Transect	(Intercept)	11.05	0.2	57.2	<0.001
		Site LØV	3.88	0.2	20.0	<0.001
		Species Douglas-fir	0.10	0.2	0.5	0.617
		Distance	0.03	0.0	1.7	0.093
		Transect_T2	–0.32	0.2	–1.9	0.060
		Transect_T3	–0.37	0.2	–2.2	0.029
		Site LØV: Distance	0.04	0.0	1.7	0.098
		Species Douglas-fir: Distance	–0.10	0.0	–4.5	<0.001
FF + 0–20 cm	C/N = Distance × Site + Species + Transect	(Intercept)	12.94	0.4	36.4	<0.001
		Site LØV	5.31	0.3	18.4	<0.001
		Species Douglas-fir	0.57	0.3	2.0	0.052
		Distance	0.00	0.0	0.2	0.857
		Transect_T2	–0.15	0.4	–0.4	0.682
		Transect_T3	0.25	0.4	0.7	0.475

Table S12. Across site effects on soil pH by soil layers.

Soil Layers	Models	Variables	Slope	Std. Error	*t*-value	*p*-value
FF	pH = Distance × (Site + Species) + Transect	(Intercept)	5.06	0.1	60.7	<0.001
		Site LØV	–0.17	0.1	–2.0	0.048
		Species Douglas-fir	–0.21	0.1	–2.5	0.015
		Distance	0.01	0.0	1.8	0.078
		TransT2	0.07	0.1	1.0	0.321
		TransT3	0.11	0.1	1.5	0.132
		Site LØV: Distance	–0.02	0.0	–1.8	0.069
		Species Douglas-fir: Distance	–0.02	0.0	–1.8	0.080
0–5 cm	pH = Distance × Species + Site + Transect	(Intercept)	4.51	0.1	41.6	<0.001
		Site LØV	–0.52	0.1	–6.4	<0.001
		Species Douglas-fir	–0.11	0.1	–0.9	0.349
		Distance	0.00	0.0	0.3	0.743
		TransT2	–0.15	0.1	–1.5	0.127
		TransT3	0.09	0.1	0.9	0.392
		Species Douglas-fir: Distance	–0.03	0.0	–1.9	0.061
5–10 cm	pH = Distance + Site + Species + Transect	(Intercept)	4.46	0.1	74.8	<0.001
		Site LØV	–0.54	0.0	–11.2	<0.001
		Species Douglas-fir	0.04	0.0	0.8	0.429
		Distance	0.00	0.0	–0.2	0.828
		TransT2	–0.07	0.1	–1.2	0.246
		TransT3	0.10	0.1	1.7	0.090
10–20 cm	pH = Distance × Site + Species + Transect	(Intercept)	4.84	0.1	82.2	<0.001
		Site LØV	–0.78	0.1	–12.3	<0.001
		Species Douglas-fir	0.13	0.0	3.0	0.004
		Distance	0.02	0.0	3.0	0.003
		TransT2	–0.07	0.1	–1.2	0.217
		TransT3	0.07	0.1	1.2	0.217
		Site LØV: Distance	–0.02	0.0	–2.8	0.006

Table S13. *R*-squared values of across site models by soil layers and soil properties.

Soil Layer	Soil Property	*R*–squared
FF	Soil C stock	0.51
	N stock	0.58
	C/N ratio	0.52
	Soil pH	0.49
0–5cm	Soil C stock	0.40
	N stock	0.70
	C/N ratio	0.62
	Soil pH	0.49
5–10cm	Soil C stock	0.72
	N stock	0.80
	C/N ratio	0.51
	Soil pH	0.67
10–20cm	C stock	0.79
	N stock	0.89
	C/N ratio	0.94
	Soil pH	0.87
FF + 0–20cm	Soil C stock	0.48
	Soil N stock	0.88
	C/N ratio	0.84