Taxa list (alphabetically)	No.	No.	Taxa list (stratigraphically)	Artemisia Zone: Taglu 5.0 - 70.7 m MEAN	STD (N=5)	Taglu 75.7 - 119.9 m MEAN	STD (N=5)	Taglu 169.9 - 263.4 m MEAN	STD (N=6)	CRH-94 MEAN	STD (N=11)	Poaceae Zone: Taglu 332.8 - 349.8 m MEAN	STD (N=5)	Lost Chicken Mine MEAN	STD (N=32)	Ericales Zone: McCallum Cr. MEAN	STD (N=2)	Lava Camp MEAN	STD (N=2)	Betulaceae Zone: Cyperaceae subzone: Canyon Village (Loc. 90-7) MEAN	STD (N=23)	Usibelli Gp. Zone G MEAN	STD (N=6)	Transitional subzone: Usibelli Gp. Zone L-2 MEAN	STD (N=7)	Usibelli Gp. Zone L-1 MEAN	STD (N=7)	Polygonaceae subzone: Usibelli Gp. Zone S-3b MEAN	STD (N=6)	Usibelli Gp. Zone S-3a MEAN	STD (N=6)	Fagaceae Zone: Juglans subzone: Usibelli Gp. Zone S-2 (upper) MEAN	STD (N=6)	Usibelli Gp. Zone S-2 (lower) MEAN	STD (N=6)	T-C-T subzone: Upper Ramparts organic bed 4 MEAN	STD (N=4)	Upper Ramparts organic bed 3 MEAN	STD (N=7)	Upper Ramparts organic bed 2 MEAN	STD (N=3)	Reevesia Zone: Usibelli Gp. Zone S-1 MEAN	STD (N=3)	Upper Ramparts organic bed 1 MEAN	STD (N=11)	Taxa list (stratigraphically)
Abies	70	1	*Reevesia*																																			0.10				*Reevesia*
Acer	14	2	*Metasequoia*-type																															2.78	± 3.48	10.89	± 3.57					*Metasequoia*-type
Alnus (4-7 pore)	61	3	*Pinus koraiensis*-type																															3.75	± 1.84	1.45	± 1.82					*Pinus koraiensis*-type
Ambrosia-type	45	4	*Rhus*-type																											0.1		0.1				0.09	± 0.18	0.10		0.10	± 0.33	*Rhus*-type
Apiaceae (Umbelliferae)	51	5	*Englehardtia/Alfaroa*																											0.1		0.1						0.10				*Englehardtia/Alfaroa*
Artemisia	37	6	*Osmunda* sp.	0.18	± 0.25																									0.50	± 0.76	0.67	± 1.49	1.00	± 1.53			0.005	± 0.01	2.67	± 1.70	0.06	± 0.12	*Osmunda* sp.
Asteraceae (Compositae) Liguliflorae	36	7	*Cercidiphyllum*																											0.10												*Cercidiphyllum*
Asteraceae (Compositae) Tubuliflorae	38	8	*Ilex*																			0.37	± 0.45	0.20	± 0.37			0.70	± 0.92	1.70	± 1.34	0.09	± 0.15	0.04	± 0.09			0.47	± 0.38	0.35	± 0.44	*Ilex*
Betula (all sizes)	62	9	*Quercus*											0.01	± 0.08							0.27	± 0.34	0.17	± 0.37			1.03	± 1.81	1.17	± 0.69	5.55	± 5.28	7.59	± 2.87	0.10	± 0.14	0.47	± 0.38	0.16	± 0.35	*Quercus*
Brassicaceae (Cruciferae)	50	10	*Fagus*																			0.03	± 0.07	0.07	± 0.09			0.07	± 0.09	1.07	± 1.10	5.55	± 5.02	6.91	± 2.12			0.80	± 0.85			*Fagus*
Caprifoliaceae	35	11	*Nyssa*																			0.03	± 0.07					0.53	± 0.47	1.17	± 1.07	0.44	± 0.40	0.20	± 0.36			0.07	± 0.09			*Nyssa*
Carya	18	12	*Liquidambar*																			0.03	± 0.07					0.40	± 0.43	0.23	± 0.35	0.43	± 0.26	0.34	± 0.26							*Liquidambar*
Caryophyllaceae	49	13	*Juglans*											0.01	± 0.07							0.33	± 0.32	0.40	± 0.81			2.87	± 1.70	2.93	± 2.29	0.50	± 0.47	0.16	± 0.19	0.22	± 0.15	0.13	± 0.19	0.02	± 0.07	*Juglans*
Castanea-type	20	14	*Acer*																			0.10		0.10								0.09	± 0.15	0.46	± 0.46			0.10		0.03	± 0.10	*Acer*
Cedrus	28	15	Taxodiaceae-Cupressaceae-Taxaceae											0.59	± 0.73					0.14	± 0.26			0.17	± 0.35	0.46	± 1.04	1.17	± 0.69	0.57	± 0.72	2.03	± 1.10	7.83	± 7.45	24.48	± 9.55	42.94	± 6.48	48.72	± 32.96	5.67	± 1.70	6.20	± 5.58	Taxodiaceae-Cupressaceae-Taxaceae
Cercidiphyllum	7	16	*Tilia*-type									0.29	± 0.20									0.40	± 0.72	0.37	± 0.67			0.07	± 0.09	0.93	± 1.41	0.07	± 0.09	0.70	± 0.72	0.25	± 0.27	0.14	± 0.21			0.07	± 0.09			*Tilia*-type
Chenopodineae	39	17	*Sciadopitys*																	0.04	± 0.10											0.1		0.1		0.53	± 0.39	0.04	± 0.28	0.12	± 0.15	0.10		0.30	± 0.44	*Sciadopitys*
Corylus-ty	63	18	*Carya*									0.45	± 0.44							0.01	± 0.05							0.07	± 0.09	0.57	± 1.09	4.83	± 2.91	2.83	± 1.21	1.67	± 1.25	1.30	± 0.90	0.43	± 0.31	0.73	± 0.90	0.07	± 0.14	*Carya*
Cyperaceae	46	19	*Pterocarya*																	0.13	± 0.56	0.73	± 0.69	1.34	± 1.10	0.11	± 0.10	0.33	± 0.47	0.90	± 1.11	3.23	± 2.50	2.40	± 2.06	0.26	± 0.30	0.21	± 0.18	0.66	± 0.56	1.00	± 0.82	0.07	± 0.16	*Pterocarya*
Diervilla/Weigela	23	20	*Castanea*-type																	0.02	± 0.06							0.03	± 0.07	0.03	± 0.07	0.17	± 0.37	0.03	± 0.07	0.33	± 0.39	1.20	± 0.50			0.07	± 0.09			*Castanea*-type
Englehardtia/Alfaroa	5	21	*Ostrya/Carpinus*																	0.15	± 0.55							2.53	± 1.94	0.23	± 0.35	0.40	± 0.72	1.67	± 1.49					0.05	± 0.11			*Ostrya/Carpinus*
Epilobium	57	22	*Tsuga mertensiana*																	0.03	± 0.09	0.10						0.10		0.10		0.1		0.1		0.01	± 0.02	0.13	± 0.21					*Tsuga mertensiana*
Ericales	65	23	*Diervilla/Weigela*																	0.03	± 0.09			0.03	± 0.07	0.03	± 0.07			0.03	± 0.07	0.03	± 0.07	0.03	± 0.07	0.03	± 0.07							*Diervilla/Weigela*
Eriogonum	42	24	*Trapa*																± 0.20	0.03	± 0.08																					*Trapa*
Fabaceae (Leguminosae)	58	25	*Tsuga canadensis*-type															0.09	± 0.09			2.00	± 1.91	3.60	± 3.39	1.03	± 0.90	1.03	± 0.52	6.00	± 4.65	7.37	± 8.95	1.83	± 1.07	1.82	± 1.66	0.49	± 0.38	0.55	± 0.42	2.07	± 1.55	1.46	± 0.78	*Tsuga canadensis*-type
Fagus	10	26	*Tsuga heterophylla*-type															0.18	± 0.01	0.26	± 0.33	0.37	± 0.45	0.31	± 0.69	0.46	± 0.47	0.50	± 0.50	1.67	± 0.75	1.83	± 0.90	0.90	± 0.61	1.73	± 0.96	0.26	± 0.18	0.24	± 0.32	0.40	± 0.43	0.13	± 0.17	*Tsuga heterophylla*-type
Ilex	8	27	*Tsuga* sp.											0.19	± 0.38					0.85	± 0.99	0.03	± 0.07					0.17	± 0.37	1.07	± 0.94	0.43	± 0.71	0.23	± 0.35	0.17	± 0.29			0.11	± 0.16			1.51	± 0.78	*Tsuga* sp.
Juglans	13	28	*Cedrus*													0.21	± 0.21													0.10		0.1		0.1						0.10				*Cedrus*
Jussiaea (Ludwigia)	31	29	*Ulmus*-type									0.45	± 0.29	0.01	± 0.07					0.002	± 0.008	0.60	± 0.71	1.00	± 0.54	0.31	± 0.69	4.20	± 3.46	1.27	± 0.85	2.93	± 1.71	5.53	± 2.96	1.25	± 1.33	1.52	± 1.40	0.23	± 0.32	2.00	± 1.41			*Ulmus*-type
Larix-type (including *Pseudotsuga*)	71	30	*Pinus* (robust corpus)													0.21	± 0.21																			0.68	± 0.42	0.05	± 0.11			0.56	± 0.41	*Pinus* (robust corpus)
Liquidambar	12	31	*Jussiaea (Ludwigia)*													0.21	± 0.21																									0.03	± 0.09	*Jussiaea (Ludwigia)*
Menyanthes	53	32	*Typha*																	0.11	± 0.30	0.10								0.03	± 0.07	0.43	± 0.71	0.57	± 0.72					0.07	± 0.09			*Typha*
Metasequoia-type	2	33	*Nymphaea*																															0.09	± 0.15					0.10				*Nymphaea*
Myrica-type (including *Comptonia*)	72	34	*Polygonum persicaria*											0.01	± 0.06							0.10		0.10				0.10												0.10				*Polygonum persicaria*
Myriophyllum	76	35	Caprifoliaceae													0.85	± 0.82	0.01	± 0.01			0.03	± 0.07	0.03	± 0.07	0.06	± 0.09															Caprifoliaceae
Nuphar	47	36	Asteraceae (Compositae) Liguliflorae											0.01	± 0.06																	0.1		0.1								Asteraceae (Compositae) Liguliflorae
Nymphaea	33	37	*Artemisia*	2.06	± 3.43	3.20	± 3.60	1.30	± 0.86	6.08	± 2.31	0.37	± 0.31	0.01	± 0.07					0.01	± 0.06					0.10						0.1		0.1								*Artemisia*
Nyssa	11	38	Asteraceae (Compositae) Tubuliflorae	0.67	± 0.78	0.13	± 0.25	0.24	± 0.14	0.16	± 0.17	0.12	± 0.24	0.24	± 0.71											0.03	± 0.07	0.10														Asteraceae (Compositae) Tubuliflorae
Onagraceae	73	39	Chenopodiineae	0.10	± 0.21	6.52	± 12.52	0.32	± 0.27			0.24	± 0.48	0.01	± 0.06							0.10		0.10						0.10		0.1		0.1								Chenopodiineae
Osmunda sp.	6	40	*Populus*	0.57	± 0.51	0.06	± 0.12	0.11	± 0.17	0.07	± 0.17			0.08	± 0.23							0.02	± 0.07	0.10		0.10																*Populus*
Ostrya/Carpinus	21	41	*Polygonum viviparum*											0.09	± 0.23																											*Polygonum viviparum*
Picea spp. (Sum)	68	42	*Eriogonum*											0.01	± 0.06																											*Eriogonum*
Pinus (robust corpus)	30	43	*Polygonum* sp.							0.32	± 0.35																															*Polygonum* sp.
Pinus koraiensis-type	3	44	*Rumex*											0.02	± 0.13															0.03	± 0.07											*Rumex*
Pinus spp. (Sum)	69	45	*Ambrosia*-type	0.05	± 0.10	0.05	± 0.10	0.09	± 0.12	0.04	± 0.11	0.08	± 0.17											0.10																*Ambrosia*-type
Plantago	59	46	Cyperaceae	5.56	± 1.58	13.80	± 5.82	14.25	± 7.92	5.81	± 2.61	7.06	± 2.23	10.44	± 7.37					0.37	± 0.37	0.80	± 0.89	0.10																		Cyperaceae
Poaceae (Gramineae)	66	47	*Nuphar*					0.08	± 0.12	0.02	± 0.06			0.01	± 0.07	0.32						0.02	± 0.06																			*Nuphar*
Polemonium	52	48	*Sagittaria*							0.02	± 0.05											0.10	± 0.33																			*Sagittaria*
Polygonaceae	56	49	Caryophyllaceae	0.44	± 0.89	0.06	± 0.13	0.17	± 0.28	0.32	± 0.22	0.81	± 0.19	0.06	± 0.20	0.02	± 0.02																								Caryophyllaceae
Polygonum persicaria	34	50	Brassicaceae (Cruciferae)	0.06	± 0.12					1.67	± 1.28	0.12	± 0.23	0.22	± 0.43																											Brassicaceae (Cruciferae)
Polygonum sp.	43	51	Apiaceae (Umbelliferae)							0.17	± 0.16			0.01	± 0.08																											Apiaceae (Umbelliferae)
Polygonum viviparum	41	52	*Polemonium*							0.10	± 0.16			0.03	± 0.12																											*Polemonium*
Populus	40	53	*Menyanthes*			0.34	± 0.68							0.04	± 0.14																											*Menyanthes*
Potamogeton	54	54	*Potamogeton*	0.51	± 0.87	1.36	± 2.71	0.07	± 0.10																															*Potamogeton*
Pterocarya	19	55	*Shepherdia canadensis*	0.12	± 0.15			0.37	± 0.56	0.13	± 0.15																															*Shepherdia canadensis*
Quercus	9	56	Polygonaceae	0.06	± 0.13							0.08	± 0.17																													Polygonaceae
Ranunculaceae	74	57	*Epilobium*							0.22	± 0.29																															*Epilobium*
Reevesia	1	58	Fabaceae (Leguminosae)							0.04	± 0.12																															Fabaceae (Leguminosae)
Rhus-type	4	59	*Plantago*							0.30	± 0.41	0.16	± 0.23																													*Plantago*
Rosaceae	75	60	*Valeriana*							0.12	± 0.16																															*Valeriana*
Rumex	44	61	*Alnus* (4-7 pore)	15.09	± 8.21	5.98	± 2.77	4.63	± 2.81	6.16	± 2.60	9.89	± 5.70	4.08	± 2.06	0.69	± 0.28	6.96	± 0.53	12.58	± 3.34	23.07	± 6.29	31.57	± 17.22	33.09	± 10.22	34.60	± 14.30	29.23	± 19.95	29.60	± 18.65	22.73	± 10.23	3.99	± 1.39	3.04	± 1.48	9.45	± 5.63	18.53	± 8.73	14.43	± 5.78	*Alnus* (4-7 pore)
Sagittaria	48	62	*Betula* (all sizes)	4.35	± 1.71	5.70	± 2.87	5.83	± 1.04	29.71	± 6.97	27.18	± 5.29	10.75	± 5.70	1.02	± 0.60	10.69	± 0.03	47.37	± 6.99	14.83	± 7.97	29.60	± 11.80	14.34	± 6.55	20.73	± 11.95	15.67	± 6.21	9.50	± 6.24	11.50	± 5.32	7.90	± 3.26	4.67	± 0.91	2.67	± 1.95	6.00	± 3.74	8.85	± 3.13	*Betula* (all sizes)
Salix	64	63	*Corylus*-ty	0.06	± 0.12	0.06	± 0.12	0.05	± 0.12	0.22	± 0.27	0.16	± 0.23	1.16	± 2.19			0.46	± 0.46	0.51	± 0.59	0.03	± 0.07	0.11	± 0.10	0.17	± 0.35	2.67	± 1.11	1.67	± 2.49	3.00	± 1.83	4.33	± 1.89	1.93	± 1.11	0.87	± 0.74			2.67	± 1.70	0.92	± 0.64	*Corylus*-ty
Sciadopitys	17	64	*Salix*	1.40	± 1.56	1.38	± 1.28	1.96	± 1.53	1.43	± 0.75	0.79	± 0.98	2.75	± 2.96			0.26	± 0.08	0.99	± 0.70	0.23	± 0.35	0.14	± 0.09	0.14	± 0.09	0.10	± 0.10			0.07	± 0.09	0.73	± 0.90	0.08	± 0.15	0.17	± 0.15	0.32	± 0.25	0.73	± 0.38	0.27	± 0.29	*Salix*
Shepherdia canadensis	55	65	Ericales	0.77	± 0.77	0.17	± 0.23	0.99	± 0.46	10.52	± 3.83	2.21	± 0.89	5.53	± 2.14	7.01	± 0.76	5.89	± 1.46	2.04	± 2.32	0.73	± 0.90	0.17	± 0.07	1.23	± 0.98	1.07	± 1.19	0.63	± 0.72	1.37	± 2.11	1.30	± 1.48							1.80	± 1.73	1.02	± 0.89	Ericales
Sparganium	77	66	Poaceae (Gramineae)	2.74	± 2.41	7.00	± 6.07	4.22	± 2.82	4.25	± 1.88	6.94	± 0.95	5.57	± 3.62	0.21	± 0.21			0.34	± 0.51	0.10		0.06	± 0.09	0.20	± 0.34	0.67	± 0.94	0.10		0.10	± 0.10	0.10	± 0.10							0.13	± 0.09			Poaceae (Gramineae)
Sphagnum	67	67	*Sphagnum*	6.44	± 3.89	5.24	± 3.88	13.77	± 2.59	12.39	± 3.86	11.13	± 6.19	23.65	± 10.64	2.52	± 1.69	49.53	± 5.06	5.14	± 5.26	1.67	± 1.37	0.43	± 0.49	3.43	± 1.99	2.83	± 2.48	1.17	± 2.19	1.67	± 3.73	2.33	± 2.75							2.00	± 2.83	1.97	± 1.77	*Sphagnum*
Taxodiaceae-Cupressaceae-Taxaceae	15	68	*Picea* spp. (Sum)	35.44	± 13.68	20.84	± 15.91	15.55	± 5.78	7.02	± 2.00	6.70	± 3.46	20.36	± 7.23	39.02	± 13.48	3.85	± 1.30	1.88	± 1.70	18.00	± 8.27	8.86	± 5.05	14.14	± 7.90	6.83	± 2.11	18.67	± 10.19	14.00	± 11.37	7.83	± 3.44	9.25	± 3.84	1.80	± 1.64	2.05	± 1.33	11.00	± 0.82	31.85	± 6.18	*Picea* spp. (Sum)
Tilia-type	16	69	*Pinus* spp. (Sum)	9.95	± 4.01	6.99	± 5.36	18.39	± 12.20	0.44	± 0.39	7.67	± 3.39	3.26	± 3.63	11.84	± 1.42	5.46	± 0.32	22.79	± 8.53	13.67	± 5.96	6.43	± 3.11	15.46	± 8.69	10.77	± 4.08	12.43	± 7.54	9.03	± 2.21	9.67	± 5.31	10.81	± 9.77	5.58	± 3.42	1.38	± 1.45	6.33	± 2.05	8.45	± 2.90	*Pinus* spp. (Sum)
Trapa	24	70	*Abies*	0.45	± 0.62	0.64	± 0.83	1.37	± 0.95	0.80	± 0.57	0.36	± 0.43	0.02	± 0.09	0.37	± 0.05			0.08	± 0.13	1.53	± 1.22	2.20	± 1.47	1.20	± 1.07	0.33	± 0.30	0.77	± 0.87	0.40	± 0.72	0.10	± 0.10									0.41	± 0.67	*Abies*
Tsuga canadensis-type	25	71	*Larix*-type (including *Pseudotsuga*)	0.10	± 0.21	0.05	± 0.10	0.04	± 0.09	0.14	± 0.16			2.19	± 1.78	0.58	± 0.25	0.61	± 0.24	0.11	± 0.21	1.07	± 0.94	0.57	± 0.65	0.49	± 0.45	0.33	± 0.30	0.97	± 1.12	1.90	± 2.81	1.23	± 1.29	0.45	± 0.57	0.10	± 0.15			0.33	± 0.47			*Larix*-type (including *Pseudotsuga*)
Tsuga heterophylla-type	26	72	*Myrica*-type (including *Comptonia*)	0.11	± 0.14	0.05	± 0.10	0.12	± 0.18			0.88	± 0.51	0.07	± 0.22	0.16	± 0.16			1.01	± 0.73	0.10						0.10				0.1		0.1						0.10				*Myrica*-type (including *Comptonia*)
Tsuga mertensiana	22	73	Onagraceae	0.06	± 0.12			0.08	± 0.12			0.04	± 0.08	0.08	± 0.23			0.18	± 0.18	0.02	± 0.07	0.10		0.10								0.1		0.1						0.10				Onagraceae
Tsuga sp.	27	74	Ranunculaceae			0.05	± 0.10			0.76	± 0.46			0.05	± 0.14							0.10						0.10				0.1		0.1						0.10				Ranunculaceae
Typha	32	75	Rosaceae	0.61	± 0.83	0.74	± 1.48			0.95	± 0.73	0.09	± 0.18	0.47	± 2.25					0.03	± 0.08			0.10		0.10		0.10		0.10		0.1		0.1						0.10				Rosaceae
Ulmus-type	29	76	*Myriophyllum*							0.12	± 0.28			0.04	± 0.21					0.04	± 0.10							0.23	± 0.35	0.03	± 0.07	0.03	± 0.07	0.23	± 0.35					0.10				*Myriophyllum*
Valeriana	60	77	*Sparganium*	0.05	± 0.10					0.10	± 0.22									0.07	± 0.15	0.03	± 0.07	0.06	± 0.09	0.06	± 0.09	0.53	± 1.11	0.10		0.10	± 0.10	0.20	± 0.37					0.07	± 0.09			*Sparganium*
			Sum of percentages of taxa	**88.02**		**80.41**		**83.99**		**90.57**		**84.25**		**92.17**		**65.23**		**84.62**		**97.72**		**79.93**		**88.01**		**86.86**		**93.60**		**96.83**		**102.00**		**97.33**		**88.11**		**92.93**		**67.38**		**67.57**		**79.23**		**Sum of percentages of taxa**
			Pollen and spore sum	**1372.0**		**1139.0**		**2447.0**		**5252.0**		**1819.0**		**8783.0**		**549.2**		**1132.1**		**7891.9**		**3030.7**		**3846.1**		**3953.8**		**3261.5**		**3446.1**		**3369.2**		**3276.9**		**1171.4**		**2364.6**		**862.3**		**1938.4**		**3107.8**		**Pollen and spore sum**

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Table 3. Mean percentages and standard deviations of pollen and spores in study. Taxa are listed alphabetically, and sites are listed from youngest to oldest. Zero values are not shown. Rare taxa which have been recorded as 0.1% do not have associated standard deviations. Values for Usibelli Group pollen zone S-2 are shown for the upper and lower halves. Taxa are divided into those no longer living in the study area, those extant in the study area, and long-ranging taxa.

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Table 3
(Figure 2 on reverse)
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