

Supplementary information

Table S1: Soil chemistry for 2016 samples and USGS soil and sediment samples 2007–2009

In the table below, key chemical analytes of soil and drill cuttings samples are compared to data collected by USGS at nearby sites. Each of the soil samples we collected in 2016 for laboratory analysis is compared with nearby soil data from samples collected by the USGS in 2007–2009. Where USGS soil samples were unavailable, we compared data to USGS pond sediment samples. Since drilling intensified in 2004, some sites may have been already contaminated with drill disposal waste, which could be the reason for some pond sediment with chemistry different from nearby sites. However, the median should provide a good semblance of natural background soil for comparison to our samples. Median and ranges shown are for USGS samples only, for comparison to samples we collected in 2016 of background soil and drill cuttings. All USGS samples have a PB identifier. Notes regarding samples are from the USGS database site or sample description. Data is from the USGS Geochemical Database available at https://pubs.usgs.gov/ds/608/downloads/Geochemical%20Relational%20Database/PebbleGeochem_xls/

Sample type	Site notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
Soil / cuttings	2016 sample	DDH 3129	3.2	108	1,650	3.4	215	68
sediment	near discovery, iron-staining, efflorescent salts	PB130	na	4	2,400	1.9	7	43
sediment	drillsite upgradient	PB131	na	7	272	0.3	1	53
sediment		PB131D	na	8	448	0.3	2	53
sediment	30' downgradient from DDH 3125	PB132 ^a	na	8	31	0.5	1	89
sediment		PB133	na	10	18	0.5	1	87
sediment	Large pond	PB134	na	9	11	0.6	1	74
sediment	PB026 at north end	PB254	na	17	744	0.6	2	86
sediment	PB026 re-sample	PB255	na	9	292	0.4	1	67
sediment	50 ft from DDH 3122	PB256	na	13	703	0.4	8	59
		median		9	292	0.5	1	67
	Pond sediment:	min		4	11	0.3	1	43
		max		17	2400	1.9	8	89

^a USGS data sheets note that “drill mud appears to have flowed into pond”

Sample type	Site Notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
Soil / cuttings	2016	DDH 4171	5.7	14	545	3.8	17	139
Soil / cuttings	2016	DDH12548	6	13	655	3.9	22	149
soil	about 0.5 km ENE of old drill camp	PB021	4.9	8	23	0.4	1	53
soil	not recorded	PB022	5.2	10	29	0.4	1	56
soil	40 m from DDH 4285	PB023	5.4	13	28	0.4	1	53
soil	75m from DDH 4305	PB024	4.9	14	30	0.5	1	73
soil	not recorded	PB027	4.9	12	40	0.4	1	69
soil	8 m from DDH4281	PB029	5.0	14	37	0.5	1	72
soil	seep SP27 nearby	PB030	4.1	14	735	0.6	10	78
soil	not recorded	PB031	5.0	10	92	0.3	3	49
soil	not recorded	PB066	5.2	37	36	0.6	2	87
soil	not recorded	PB067	5.6	22	28	0.6	1	75
pond sediment	same as 07PB070 ^b	PB137	na	4	2080	0.2	1	125
		median		5.0	14	0.5	1	71
	Soil only:	min		4.1	8	0.3	1	49
	:	max		5.6	37	0.6	10	87

^b No data for 07PB070 were found in USGS datasheets

Sample type	Site notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
soil / cuttings	2016	DDH 6355	2.7	242	4,865	4.1	645	242
soil / cuttings	2016	GH08-111	4.3	83	615	1.6	163	54
sediment	large pond	PB140	na	4	14	0.4	1	88
sediment	snow present	PB141	na	4	15	0.3	1	71
sediment	large, deep pond	PB142	na	8	13	0.4	1	56
sediment	grassy bottom	PB145	na	57	14	0.4	4	67
sediment	deep, beaver dam	PB146	na	7	19	0.4	1	81
sediment	near drill rig 6	PB147	na	4	14	0.3	3	51
sediment	large pond between active drill rigs	PB150	na	3	11	0.4	1	76
sediment	lake near drill rigs	PB151	na	4	11	0.1	1	23
sediment	just east of "finger lakes"	PB152	na	5	14	0.3	1	61
		median		4	14	0.4	1	67
	Pond sediment:	min		3	11	0.1	1	23
		max		57	19	0.4	4	88

Sample type	Site Notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
soil / cuttings	2016	DDH 7392	2.9	15	1203	2.3	398	11
soil	4" thick tundra	PB257	5.7	12	33	0.5	1	81
soil	10" thick tundra	PB258	5.4	25	92	0.6	2	74
soil	Tundra	PB259	5.2	19	85	0.5	2	85
soil	orange-stained (on fractures) rubble crop. Indicates pyrite?	PB260	5.6	23	147	0.6	3	88
soil	Orange-stained pyritic (?) angular fragments of hornfels. Rubblecrop?	PB261	5.8	14	36	0.6	1	82
soil	expect higher metal content	PB262	5.4	15	30	0.6	2	66
soil	alder patches	PB263	5.1	15	36	0.5	1	80
soil	blueberry bushes	PB264	5.8	13	42	0.5	1	79
		median	5.5	15	39	0.6	1	81
	Soil:	min	5.1	12	30	0.5	1	66
		max	5.8	25	147	0.6	3	88

Sample type	Site notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
soil / cuttings	2016	GH05-60	3.6	14	129	3.4	16	48
buried drill waste	2016	DDH 11540	6.3	4	475	2.0	38	33
sediment	small pond	PB159	na	19	218	0.6	9	102
sediment	large pond	PB160	na	23	228	0.5	16	84
sediment	beaver lodge	PB161	na	11	109	0.5	5	91
sediment	large pond fringed with grass; beaver lodge	PB162	na	13	80	0.4	4	81
		median		16	164	0.5	7	88
	Pond sediment:	min		11	80	0.4	4	81
		max		23	228	0.6	16	102

Sample type	Site notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
soil	2016	DDH 5324	6.2	5	7	1.6	0.3	24
soil	9 m from DDH4300	PB078	5.5	10	21	0.5	1	77
soil	not recorded	PB079	5.4	13	27	0.5	1	80
soil	not recorded	PB080	5.6	12	23	0.4	1	82
soil	60 m from water site 07PB082	PB081	4.9	11	20	0.4	1	84
soil	not recorded	PB083	5.1	14	18	0.5	1	82
soil	not recorded	PB084	5.2	8	13	0.4	1	55
soil	near DDH5327	PB085	4.7	5	12	0.3	1	45
		median	5.2	11	20	0.4	1	80
	Soil:	min	4.7	5	12	0.3	1	45
		max	5.6	14	27	0.5	1	84

Sample type	Site notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
soil	2016	DDH 12557	5.1	7	86	1.9	3	32
sediment	beaver raising dam	PB170	na	12	68	0.4	4	66
sediment	beaver raising dam, large pond	PB172	na	14	177	0.3	13	52
		median		13	123	0.3	8	59
	Pond sediment:	min		12	68	0.3	4	52
		max		14	177	0.4	13	66

Sample type	Site notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe mg/kg	Mo mg/kg	Zn mg/kg
soil	2016	DDH11527	5.1	4	28	15398	1	28
drill cuttings	2008 (USGS)	PB180	na	191	1320	5.4%	104	47
soil	site is NW of drill hole DH4192	PB033	5.5	14	96	4480	2	74
soil	duplicate	PB033D	5.8	15	102	4640	2	84
soil	not recorded	PB036	5.5	15	89	4800	2	78
soil	90 m from weathered 'discovery' hill	PB037	4.2	11	65	3220	2	55
soil	not recorded	PB038	4.9	9	29	3480	2	42
soil	10 m S of traverse line due to heavy brush	PB039	5.6	22	435	5380	5	82
soil	near top of hill ('discovery' outcrop?)	PB040	5.8	78	1830	6510	27	94
soil	near 'discovery' outcrop	PB041	6.0	57	1800	6380	24	118
soil	not recorded	PB042	4.4	10	117	2910	4	39
soil	not recorded	PB044	4.8	10	33	3440	2	58
soil	not recorded	PB045	5.1	17	225	4830	5	76
soil	about 20m from DDH3082	PB046	5.9	20	490	5850	7	90
		median	5.5	15	110	4720	3	77
	Soil:	min	4.2	9	29	2910	2	39
		max	6.0	78	1830	6510	27	118

Sample type	Site notes	Site ID	pH	As mg/kg	Cu mg/kg	Fe %	Mo mg/kg	Zn mg/kg
soil / cuttings	2016	DDH 5326	6.4	<i>na – field pH only</i>				
soil	not recorded	PB69	4.5	11	25	0.4	2	60
soil	DDH5318 is 12 m away, DDH4188 is about 40 m away	PB71	4.7	13	43	0.4	4	68
soil	not recorded	PB73	5.6	10	23	0.4	1	71
soil	not recorded	PB74	5.3	15	23	0.4	1	73
soil	17 m from DDH4293	PB75	5.4	7	20	0.4	1	68
soil	not recorded	PB77	6.3	14	31	0.5	1	83
		median	5.3	12	24	0.4	1	70
	Soil:	min	4.5	7	20	0.4	1	60
		max	6.3	15	43	0.5	4	83
