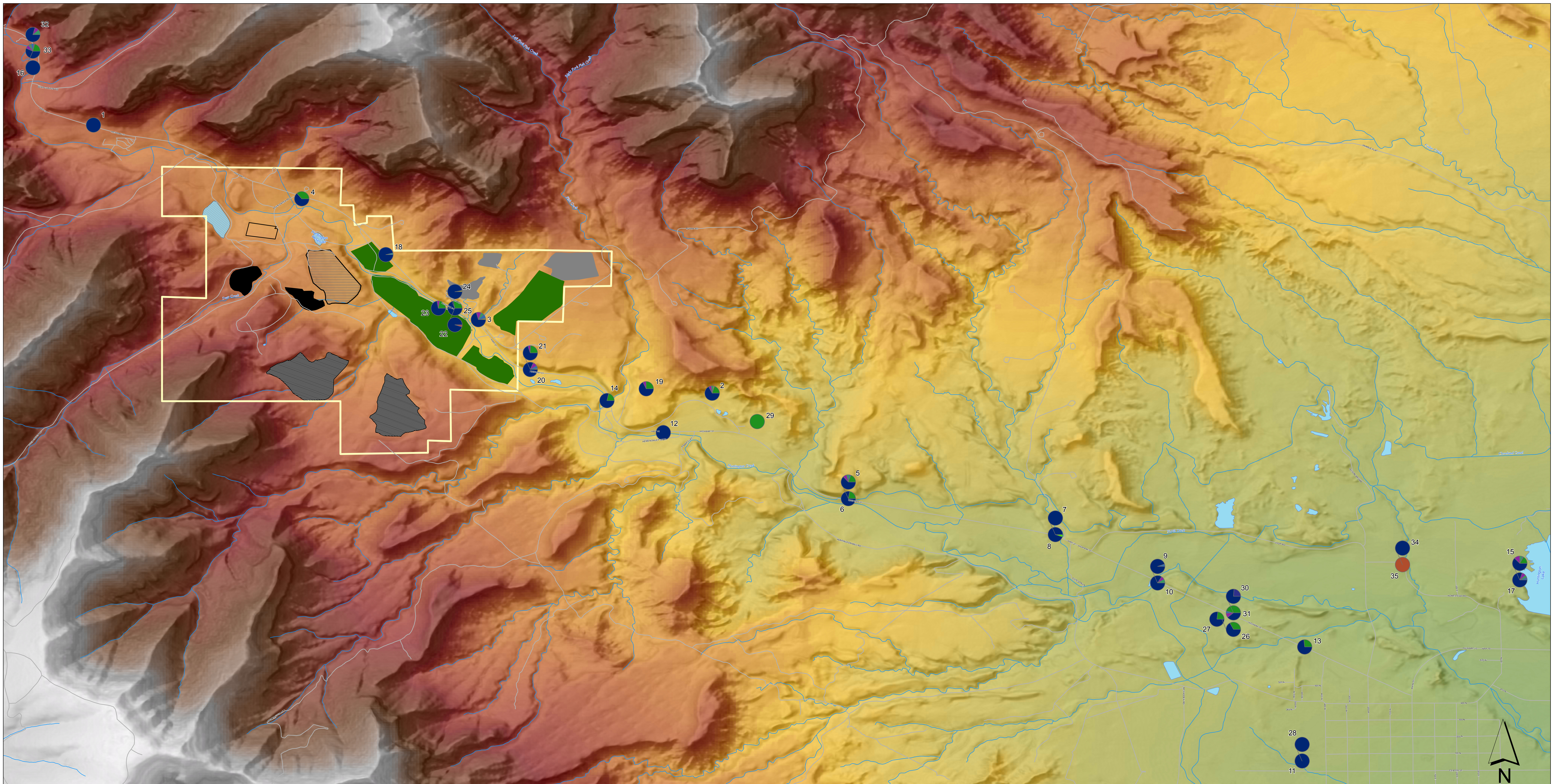


Heavy Metals in Surface Soils of Huntington Canyon, UT



The Huntington power plant is a coal power plant in a popular fishing area of central Utah. The purpose of this study is to determine whether airborne coal ash from the plant's landfills are affecting the concentrations of heavy metals in and around Huntington Canyon. Samples taken in November 2015 had arsenic at 11 ppm, cadmium at 28-52 ppm, mercury at 12 ppm, lead at 21 ppm, and antimony at 36 – 128 ppm. The highest concentrations of the metals were found adjacent to the power plant's research farm which is irrigated with wastewater from the plant, in the Huntington Lake sediments, and Huntington Creek sediments. I have concluded that these findings do not indicate airborne coal ash is contaminating the soil in Huntington Canyon nor Huntington, UT.

I collected soil samples from 23 different locations around the town of Huntington, UT and Huntington Canyon. These samples include soils upwind and downwind from the Huntington power plant and also sediments from Huntington Reservoir, Huntington Creek, and various seasonal washes in the area. We used the Niton XL2 field portable x-ray fluorescence (XRF) test our soil samples for heavy metal concentrations.

Because the coal ash is stored in landfills we believed that we would find elevated levels of arsenic, cadmium, mercury, lead, and antimony in the surface soils of Huntington Canyon and surrounding areas, with the highest concentrations 2-4 km downwind.

Test results confirming this hypothesis could indicate that airborne coal ash may be contaminating the soil.

I collected soil samples from 23 different locations around the town of Huntington, UT and Huntington Canyon. These samples include soils upwind and downwind from the Huntington power plant and also sediments from Huntington Reservoir, Huntington Creek, and various seasonal washes in the area. We used the Niton XL2 field portable x-ray fluorescence (XRF) test our soil samples for heavy metal concentrations.

The XRF detected arsenic, cadmium, mercury, lead, and antimony in some of our soil samples. One location had arsenic at 10.71 ppm adjacent to the plant property. Eight locations had detectable levels of cadmium ranging from 20.89 – 51.76 ppm. One location had mercury at 12.43 ppm located downwind of the plant. One location had lead at 20.62 ppm adjacent to the research farm property. And seven locations had antimony ranging from 40.16 – 128.05 ppm.

The highest levels of cadmium were found in the soil adjacent to, and across the street from the Deer Creek power plant's research farm. The next highest reading was upstream and upwind from the plant and the other two readings came from sediments collected from Huntington Creek and Huntington Lake.

The highest level of antimony was found in the Huntington Lake sediments. The next 3 highest concentrations were found adjacent to the research farm and further downstream near Huntington Creek.

The study found that Huntington Canyon levels of arsenic, cadmium, mercury, lead, and antimony exceed the BLM screening recommendations for recreation area residents and campers. I found that the highest concentrations of contaminants are found adjacent to the Huntington plant's research farm and in stream and lake sediments. The concentrations of heavy metals 2-4 km downwind from the plant are not consistent with airborne particulate contamination of soils.

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Spatial Data
 ESRI ArcMap 10.4.1
 Utah AGRC
 Boundaries Data: <https://gis.utah.gov/data/tgcid/cadastre/land-ownership/>
 Elevation/Terrain Data: <https://gis.utah.gov/data/elevation-terrain-data/10-30-90-meter-elevation-models-usgs-dem/>
 Water Data: <https://gis.utah.gov/data/water-data-services/lakes-rivers-dams/>

Heavy Metal Concentrations by Location (ppm)

Index	Mn	Co	Cu	As	Pd	Ag	Cd	Sn	Sb	Ba	Hg	Pb
1	0	0	0	0	0	0	0	0	0	318	0	0
2	139	0	0	0	0	18	0	34	44	476	0	0
3	0	0	0	0	0	16	52	39	60	398	0	0
4	200	0	0	0	0	0	0	0	0	348	0	0
5	135	0	0	0	0	0	28	37	58	436	0	0
6	170	0	0	0	0	0	0	0	0	600	0	0
7	0	0	0	0	0	0	0	0	0	322	0	0
8	0	0	0	0	0	0	0	0	0	236	12	0
9	0	0	0	0	0	0	25	0	0	475	0	0
10	0	0	0	0	0	0	43	40	438	0	0	0
11	0	0	0	0	0	0	0	0	0	269	0	0
12	0	0	0	0	0	0	0	0	0	191	0	0
13	173	0	0	0	0	0	0	0	0	473	0	0
14	120	0	0	0	0	0	0	0	0	443	0	0
15	165	0	0	0	0	0	26	62	128	625	0	0
16	0	0	0	0	0	0	0	0	0	379	0	0
17	0	0	0	0	0	0	28	31	47	423	0	0
18	0	0	0	11	0	0	0	0	0	290	0	0
19	149	0	0	0	0	0	0	0	42	397	0	0
20	170	0	0	0	0	0	0	0	41	482	0	0
21	0	0	0	0	0	15	44	0	67	564	0	0
22	155	0	0	0	0	0	0	0	41	498	0	0
23	0	0	0	0	0	0	0	0	0	436	0	21
24	0	0	0	0	0	12	0	0	0	422	0	0
25	153	0	0	0	0	0	0	0	41	36	297	0
26	177	0	0	0	0	0	0	0	0	358	0	0
27	112	0	0	0	0	0	0	0	0	377	0	0
28	0	0	0	0	0	0	0	0	0	354	0	0
29	87	0	0	0	0	0	0	0	0	0	0	0
30	0	109	0	0	0	0	0	0	0	350	0	0
31	204	0	0	0	0	0	21	0	43	174	0	0
32	0	0	0	0	0	0	0	41	36	297	0	0
33	109	0	0	0	11	0	33	30	46	294	0	0
34	0	0	0	0	0	0	0	0	0	245	0	0
35	0	0	44	0	0	0	0	0	0	0	0	0

BLM Recreational Screening Levels for Campers	70	50	40	1000
BLM Recreational Screening Levels for Residents	3	3	2	400

Heavy Metals

- Mn
- Co
- Cu
- As_
- Pd
- Ag
- Cd
- Sn
- Sb
- Ba
- Hg
- Pb

Plant Land Use

- Power Plant Property Boundary
- Coal Ash Pond
- Coal Pile
- Dry Coal Ash Landfill
- Huntington Power Plant & Offices
- Research Farm Field
- Reservoir
- Substation

Elevation (feet)

High : 3384
Low : 1193

Miles

0 0.5 1 2