

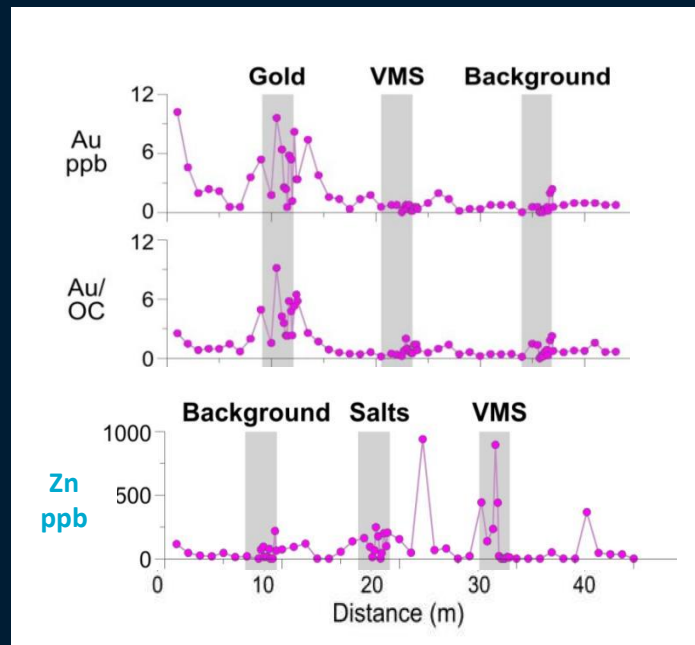


The transformative change (*paradigm shift*) to near surface exploration using ultrafine soils

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Principal Research Scientist







The issue/opportunity

Surface exploration geochemistry has stalled

Many deposits in “shallower” cover

UltraFine+ designed for these deposits



The results

All in the report (+2 journal papers)

+200% Au, Cu, Zn

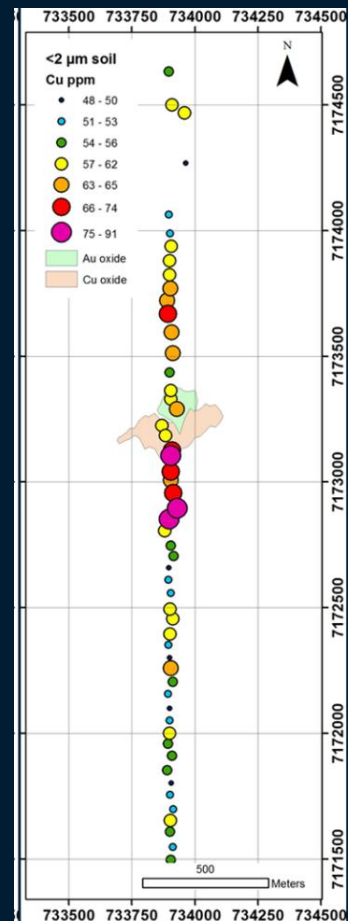
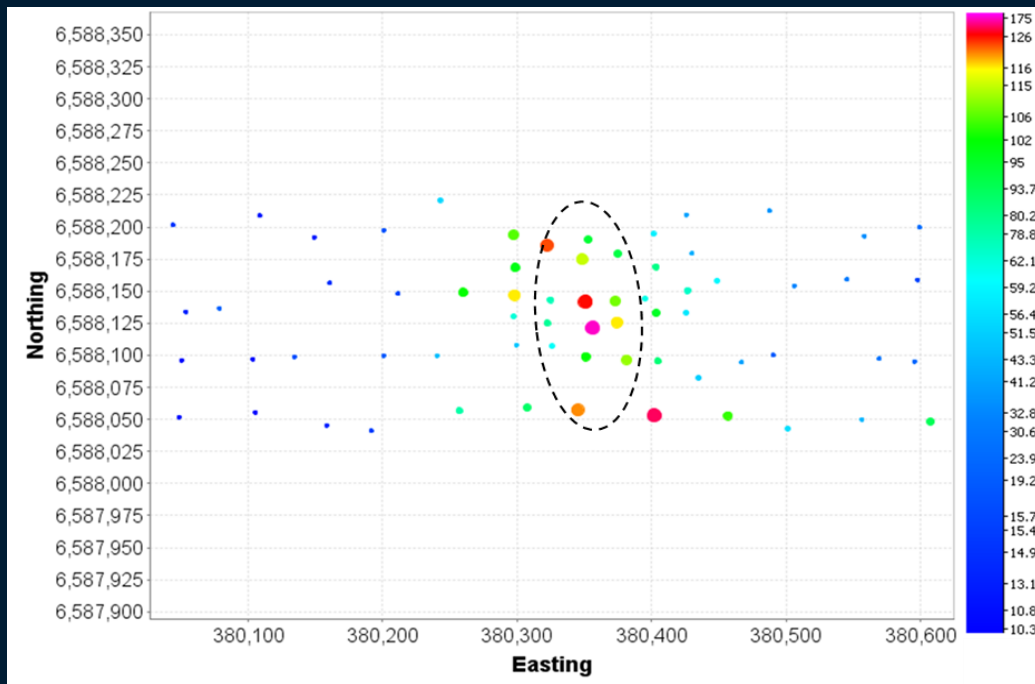
67% → 10% bdl Au

Accounts for changes in soil properties

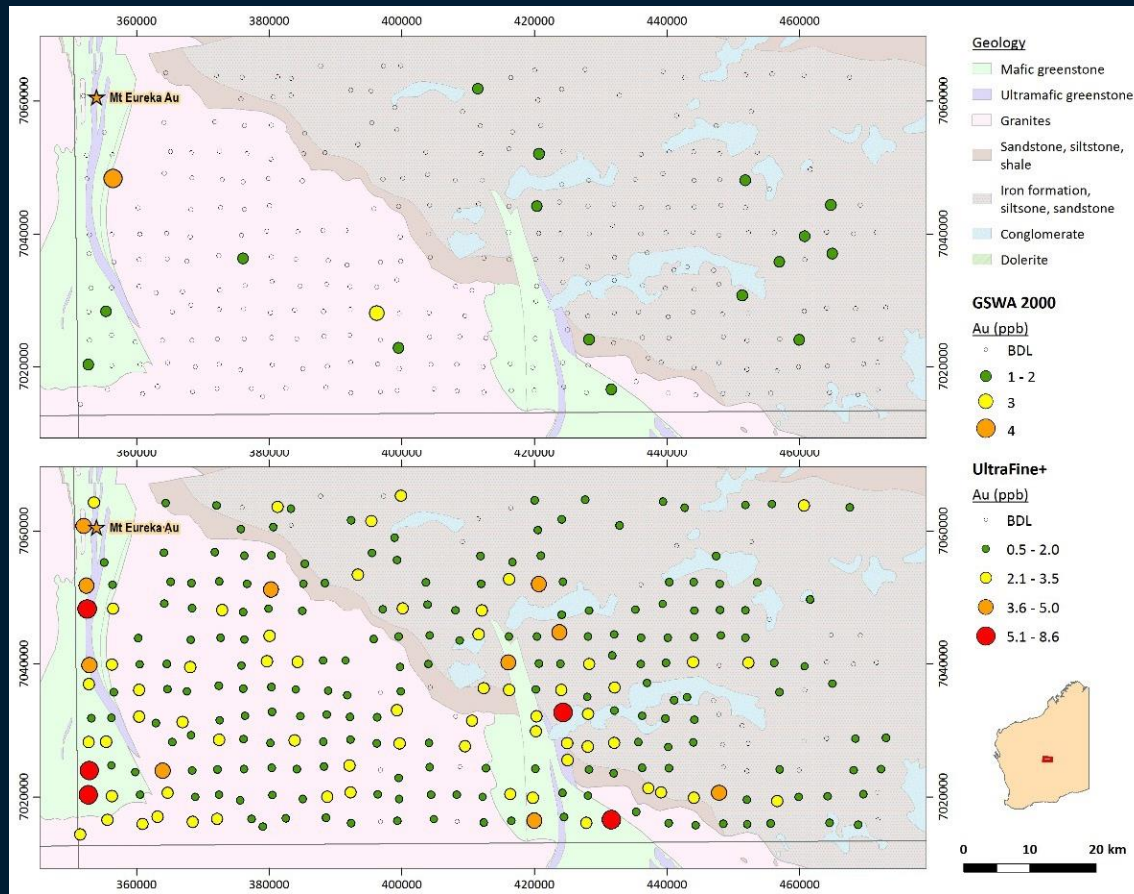
No nugget effect

World-first, industry-ready workflow

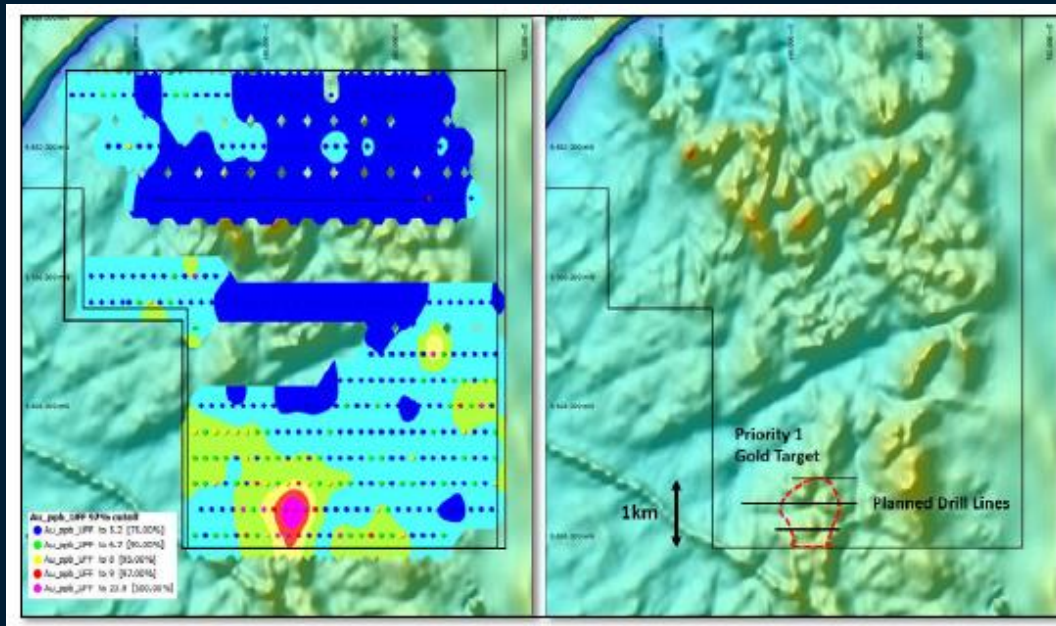




Traditional Au geochemistry



UltraFine+



Traditional soil analysis is a suite of elements

Ultra
prop
And,

eralogy, pH, soil

Element	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	
10 Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
11 DL	0.01	1.0	0.5	0.2	0.2	0.1	10	0.05	0.05	0.2	2	0.1	0.2	0.02	0.05	0.02	100	0.05	0.05	0.05	
13 Method	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	
14 ClientID/Scheme	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	
15 [07-33381]	NBD-05-01	0.10	12.26	26.6	48.7	0.8	2.1	800	<0.05	21.3	5.9	208	6.7	68.7	1.36	0.68	0.42	19.53	50.9	1.56	0.74
16 [07-33382]	NBD-05-02	0.11	14.11	27.3	43.0	1.0	2.9	1410	<0.05	21.0	3.0	320	6.9	67.2	1.41	0.70	0.42	24.76	58.5	1.62	0.82
17 [07-33383]	NBD-05-03	0.11	14.11	28.3	39.3	0.9	2.9	2250	<0.05	20.8	1.0	289	0.8	77.0	1.35	0.69	0.41	24.31	58.6	1.56	0.82
18 [07-33384]	NBD-05-04	0.10	12.46	24.8	43.4	1.0	2.6	1510	<0.05	15.6	2.9	321	0.8	61.8	1.14	0.35	0.35	21.88	59.1	1.24	0.80
19 [07-33385]	NBD-05-05	0.10	13.53	32.1	43.2	1.0	2.7	1310	<0.05	25.6	2.5	104	1.1	51.8	1.33	0.75	0.48	24.31	59.9	1.77	0.77
20 [07-33386]	NBD-05-06	0.10	11.06	30.3	41.7	1.0	2.6	1400	<0.05	18.0	2.5	119	0.8	51.3	1.27	0.59	0.40	26.81	63.2	1.42	0.75

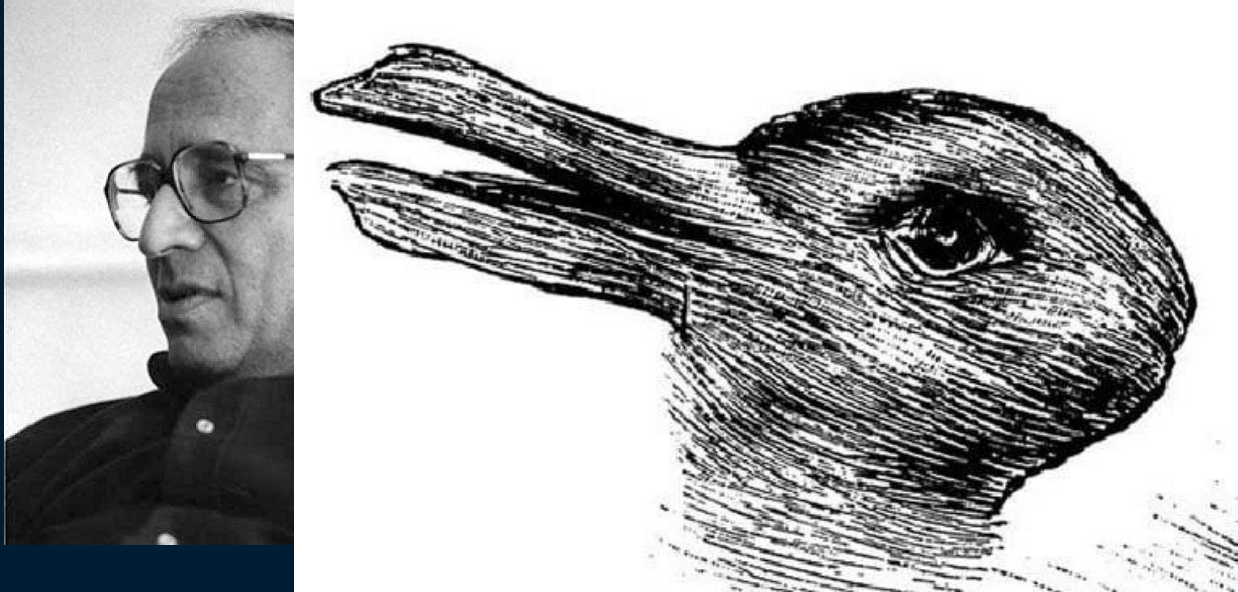
Element	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	
10 Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
11 DL	0.01	1.0	0.5	0.2	0.2	0.1	10	0.05	0.05	0.2	2	0.1	0.2	0.02	0.05	0.02	100	0.05	0.05	0.05	
13 Method	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	
14 ClientID/Scheme	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	
15 [07-33381]	NBD-05-01	0.10	12.26	26.6	48.7	0.8	2.1	800	<0.05	21.3	5.9	208	6.7	68.7	1.36	0.68	0.42	19.53	50.9	1.56	0.74
16 [07-33382]	NBD-05-02	0.11	14.11	27.3	43.0	1.0	2.9	1410	<0.05	21.0	3.0	320	6.9	67.2	1.41	0.70	0.42	24.76	58.5	1.62	0.82
17 [07-33383]	NBD-05-03	0.11	14.11	28.3	39.3	0.9	2.9	2250	<0.05	20.8	1.0	289	0.8	77.0	1.35	0.69	0.41	24.31	58.6	1.56	0.82
18 [07-33384]	NBD-05-04	0.10	12.46	24.8	43.4	1.0	2.6	1510	<0.05	15.6	2.9	321	0.8	61.8	1.14	0.35	0.35	21.88	59.1	1.24	0.80
19 [07-33385]	NBD-05-05	0.10	13.53	32.1	43.2	1.0	2.7	1310	<0.05	25.6	2.5	104	1.1	51.8	1.33	0.75	0.48	24.31	59.9	1.77	0.77
20 [07-33386]	NBD-05-06	0.10	11.06	30.3	41.7	1.0	2.6	1400	<0.05	18.0	2.5	119	0.8	51.3	1.27	0.59	0.40	26.81	63.2	1.42	0.75

Element	Au	Av	Aw	Ax	AY	Az	Ba	Bb	Bc	Bd	Be	Bf	Bg	Bh	Bi	Bj	Bk	Bm	Bn	Bo	Bp
10 Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
11 DL	0.01	1.0	0.5	0.2	0.2	0.1	10	0.05	0.05	0.2	2	0.1	0.2	0.02	0.05	0.02	100	0.05	0.05	0.05	
13 Method	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	
14 ClientID/Scheme	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	
15 [07-33381]	NBD-05-01	0.10	12.26	26.6	48.7	0.8	2.1	800	<0.05	21.3	5.9	208	6.7	68.7	1.36	0.68	0.42	19.53	50.9	1.56	0.74
16 [07-33382]	NBD-05-02	0.11	14.11	27.3	43.0	1.0	2.9	1410	<0.05	21.0	3.0	320	6.9	67.2	1.41	0.70	0.42	24.76	58.5	1.62	0.82
17 [07-33383]	NBD-05-03	0.11	14.11	28.3	39.3	0.9	2.9	2250	<0.05	20.8	1.0	289	0.8	77.0	1.35	0.69	0.41	24.31	58.6	1.56	0.82
18 [07-33384]	NBD-05-04	0.10	12.46	24.8	43.4	1.0	2.6	1510	<0.05	15.6	2.9	321	0.8	61.8	1.14	0.35	0.35	21.88	59.1	1.24	0.80
19 [07-33385]	NBD-05-05	0.10	13.53	32.1	43.2	1.0	2.7	1310	<0.05	25.6	2.5	104	1.1	51.8	1.33	0.75	0.48	24.31	59.9	1.77	0.77
20 [07-33386]	NBD-05-06	0.10	11.06	30.3	41.7	1.0	2.6	1400	<0.05	18.0	2.5	119	0.8	51.3	1.27	0.59	0.40	26.81	63.2	1.42	0.75

Element	Bq	Br	Bs	Bt	Bu	Bv	Bw	Bx	Bz	Ca	Cb	Cc	Cd	Ce	Cf	Cg	Ch	Ci	Cj	Ck	Cl	Cm
10 Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
11 DL	0.01	0.2	14.8	706	0.6	1.02	139	0.4	14.3	57.9	25	39.59	6.91	25.75	233	37.37455	53.79097	36.29036	4.530748	0.907594	3.888241	0.153209
13 Method	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	T-AP-004	
14 ClientID/Scheme	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	MMA04	
15 [07-33381]	NBD-05-01	0.10	12.26	26.6	48.7	0.8	2.1	800	<0.05	21.3	5.9	208	6.7	68.7	1.36	0.68	0.42	19.53	50.9	1.56	0.74	
16 [07-33382]	NBD-05-02	0.11	14.11	27.3	43.0	1.0	2.9	1410	<0.05	21.0	3.0	320	6.9	67.2	1.41	0.70	0.42	24.76	58.5	1.62	0.82	
17 [07-33383]	NBD-05-03	0.11	14.11	28.3	39.3	0.9	2.9	2250	<0.05	20.8	1.0	289	0.8	77.0	1.35	0.69	0.41	24.31	58.6	1.56	0.82	
18 [07-33384]	NBD-05-04	0.10	12.46	24.8	43.4	1.0	2.6	1510	<0.05	15.6	2.9	321	0.8	61.8	1.14	0.35	0.35	21.88	59.1	1.24	0.80	
19 [07-33385]	NBD-05-05	0.10	13.53	32.1	43.2	1.0	2.7	1310	<0.05	25.6	2.5	104	1.1	51.8	1.33	0.75	0.48	24.31	59.9	1.77	0.77	
20 [07-33386]	NBD-05-06	0.10	11.06	30.3	41.7	1.0	2.6	1400	<0.05	18.0	2.5	119	0.8	51.3	1.27	0.59	0.40	26.81	63.2	1.42	0.75	

Element	Specific Si	Dx (10)	Dx (50)	Dx (90)	Sample Ni	Mini	STSA	Wt1	STSA	Error	STSA	kaolin	ab	1400D	3p	2200AR	Water	ab	ferric	hem	goe	colour	pl	Albedo	Min1	STSA	Wt1	STSA	Error	STSA	((1000R))	1380D	wmAlsmi	wmAlsmi	prof
1	0.569	57.034	0.253	0.135	16.505	0.163	0.0897	893.39	5YR 4/4	0.284	NULL	NULL	NULL	0.837	0.00842	NULL	NULL	0.806	0.0105	NULL	NULL	0.887	0.0112	NULL	0.875	0.0622	NULL	0.828	0.0116	NULL	0.828	0.0116	NULL	0.828	
2	0.569	57.034	0.253	0.135	16.505	0.163	0.0897	893.39	5YR 4/4	0.284	NULL	NULL	NULL	0.837	0.00842	NULL	NULL	0.806	0.0105	NULL	NULL	0.887	0.0112	NULL	0.875	0.0622	NULL	0.828	0.0116	NULL	0.828	0.0116	NULL	0.828	
3	0.576	78.643	0.294	0.157	19.213	0.257	0.0961	895.28	5YR 3/2	0.181	NULL	NULL	NULL	0.806	0.0105	NULL	NULL	0.887	0.0112	NULL	NULL	0.875	0.0622	NULL	0.828	0.0116	NULL	0.828	0.0116	NULL	0.828	0.0116	NULL	0.828	
4	0.71	81.155	0.284	0.163	18.649	0.259	0.103	894.47	5YR 3/4	0.181	NULL	NULL	NULL	0.806	0.0112	NULL	NULL	0.887	0.0112	NULL	NULL	0.875	0.0622	NULL	0.828	0.0116	NULL	0.828	0.0116	NULL	0.828	0.0116	NULL	0.828	
5	0.592	48.691	0.207	0.116	13.627	0.183	0.0778	893.6	5YR 4/4	0.284	NULL	NULL	NULL	0.837	0.00842	NULL	NULL	0.806	0.0105	NULL	NULL	0.887	0.0112	NULL	0.875	0.0622	NULL	0.828	0.0116	NULL	0.828	0.0116	NULL	0.828	
6	0.683	81.21	0.326	0.17	21.478	0.275	0.105	895.62	5YR 3/4	0.181	NULL	NULL	NULL	0.806	0.0112																				

The solution



Leverage bigger/interoperable data (easily)

Explain false positives

Make decisions using uncertainty

Generate better targets, faster

Effective exploration through cover

UltraFine+ is the launch point for the shift

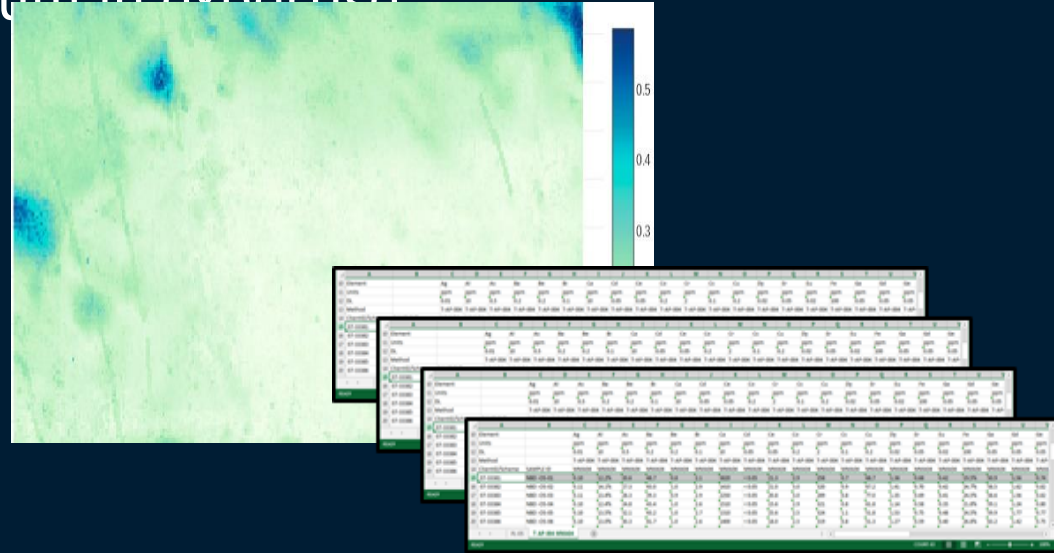
The future

Data, in landscape/soil-type context for faster review

Blend machine learning and human expertise

Submit samples to the lab

- ✓ UltraFine+
- ✓ ML/CSIRO data/products



New project, new knowledge, new products, new platform
3 year, multi-commodity
\$19k p.a. or \$9.5k p.a. for juniors

The transformative change to near surface
exploration using ultrafine soils





2 min video



Report



Proposal



Thank you for your time

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