GRASS GIS for Anthropologists

9/21/2006

Vector Data

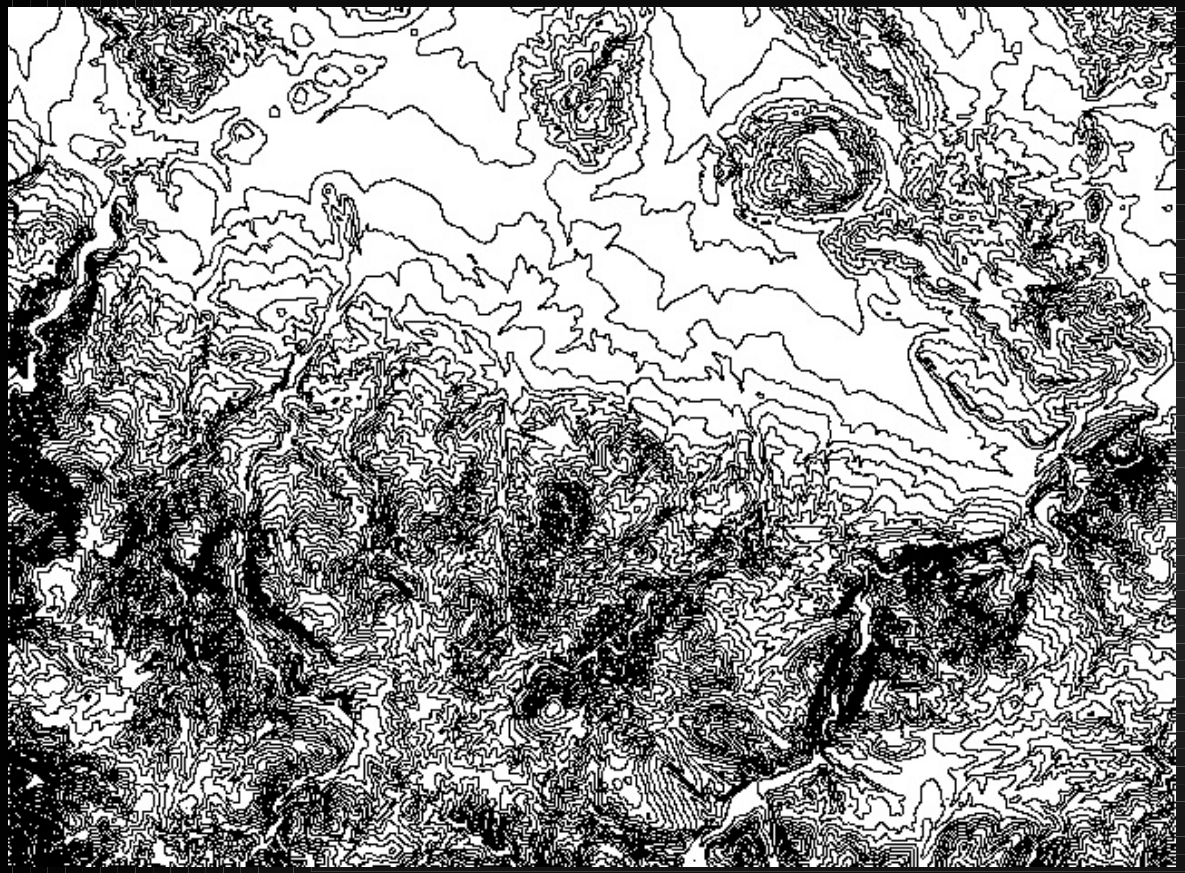
- Discreet geometrical objects which are either points, lines, or polygons
- Vertices are placed by X and Y location for all vector types, and shapes are made by geometry
- For line and polygons, the vertices are joined by lines according to a function
- Attributes are associated with each shape
- Attributes are stored in a database of info (and therefore each object can be multidimensional)
- Easy database editing with Excel/Open Office (most are in .dbf format)

Raster Data

- Continuous data (a matrix of values)
- Each layer has 3.5 dimensions of data
- Multiple layers can be stacked to represent many dimensions of data
- Display of data can be adjusted and tweaked for heuristic analysis
- Raster surfaces can be interpolated from discreet (ie. vector) data
- Can map fuzzy datasets, and so can be used to model all sorts of non-categorical data
- Complex statistics and math can be done *at each pixel* on single layers or as functions of two or more layers

Which is Better?

- It depends on your needs
- Vectors are better for associating many data types with one spatial object (ie. site point) in one file
- Vectors can only be used to represent discreet phenomena
- Raster's are better at representing massive amounts of spatially differing data
- They are also better for doing mathematical operations on that data
- They can represent discreet data, but only in one dimension per layer
- Resolution counts! As do extents!



File Edit View Insert Format Tools Data Window

A1 cat

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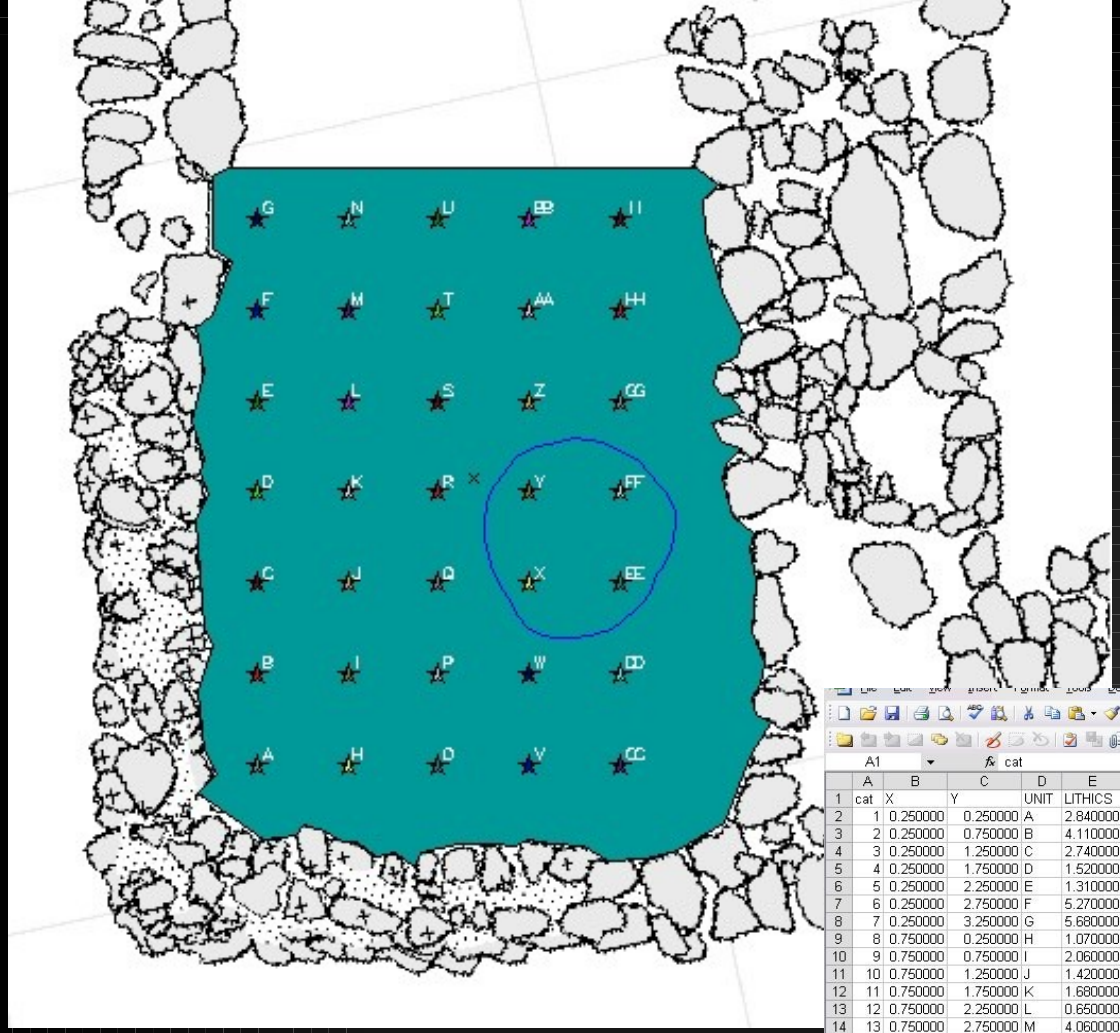
contours20m

Draw AutoShapes

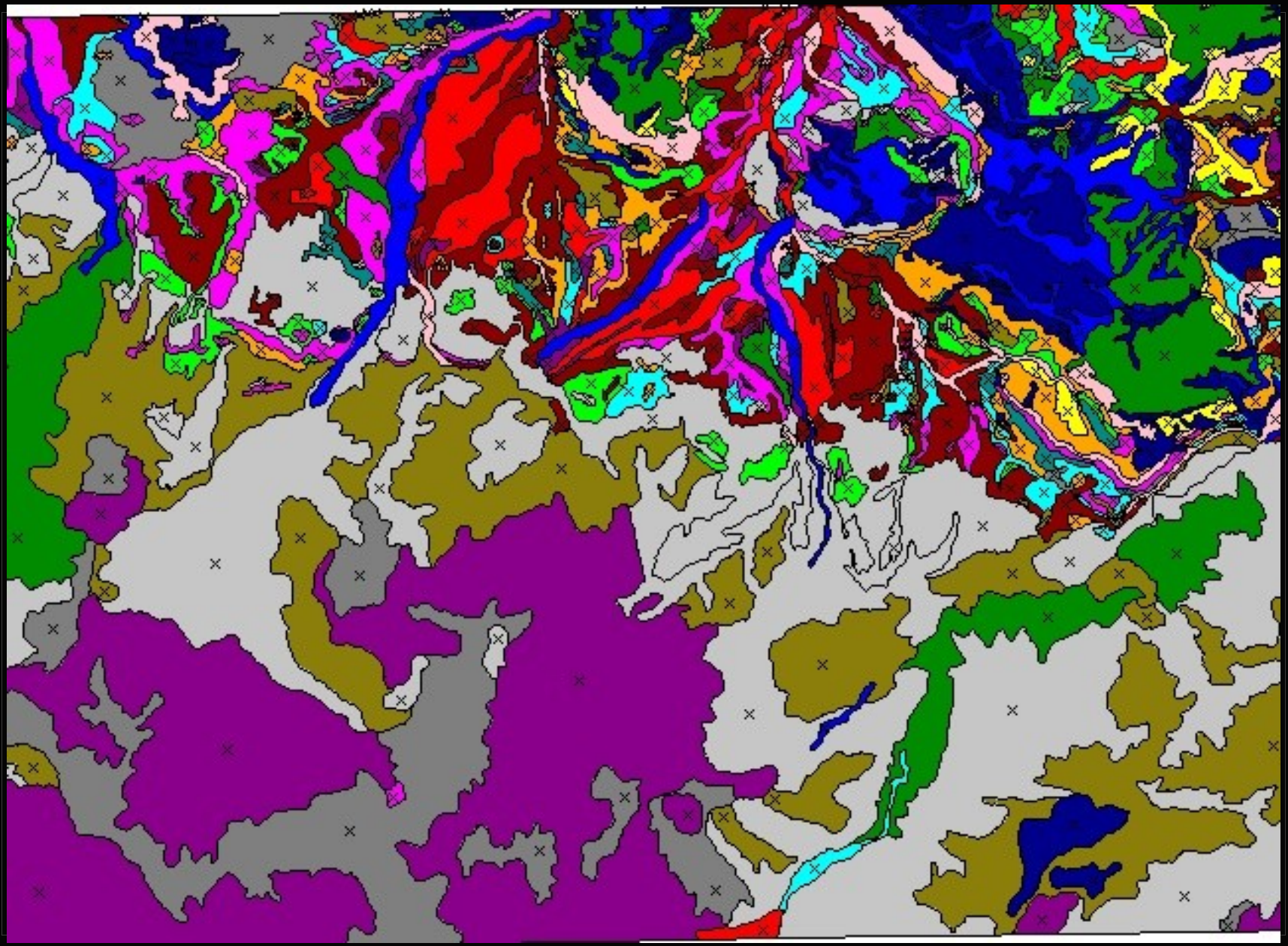
Ready

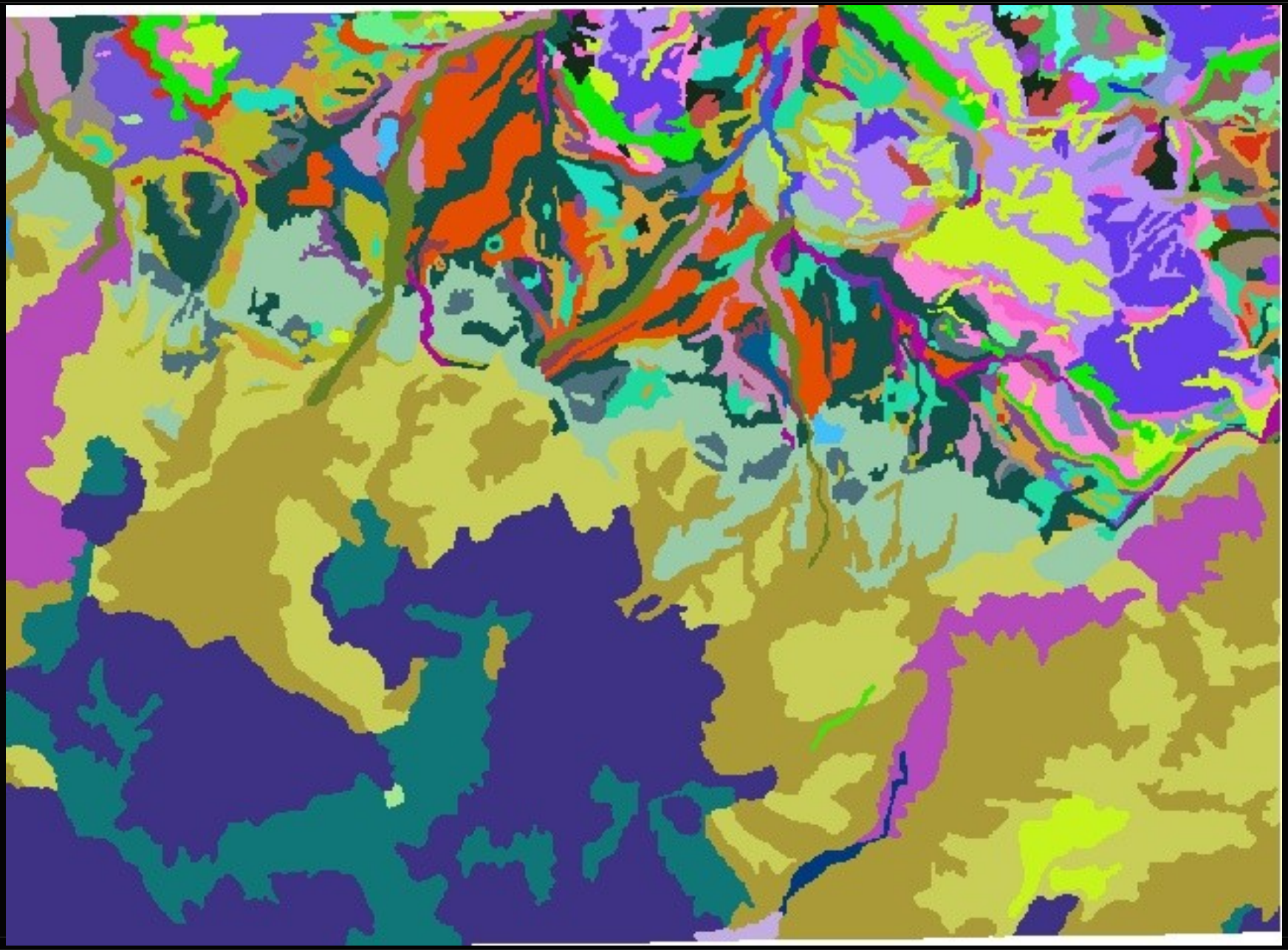


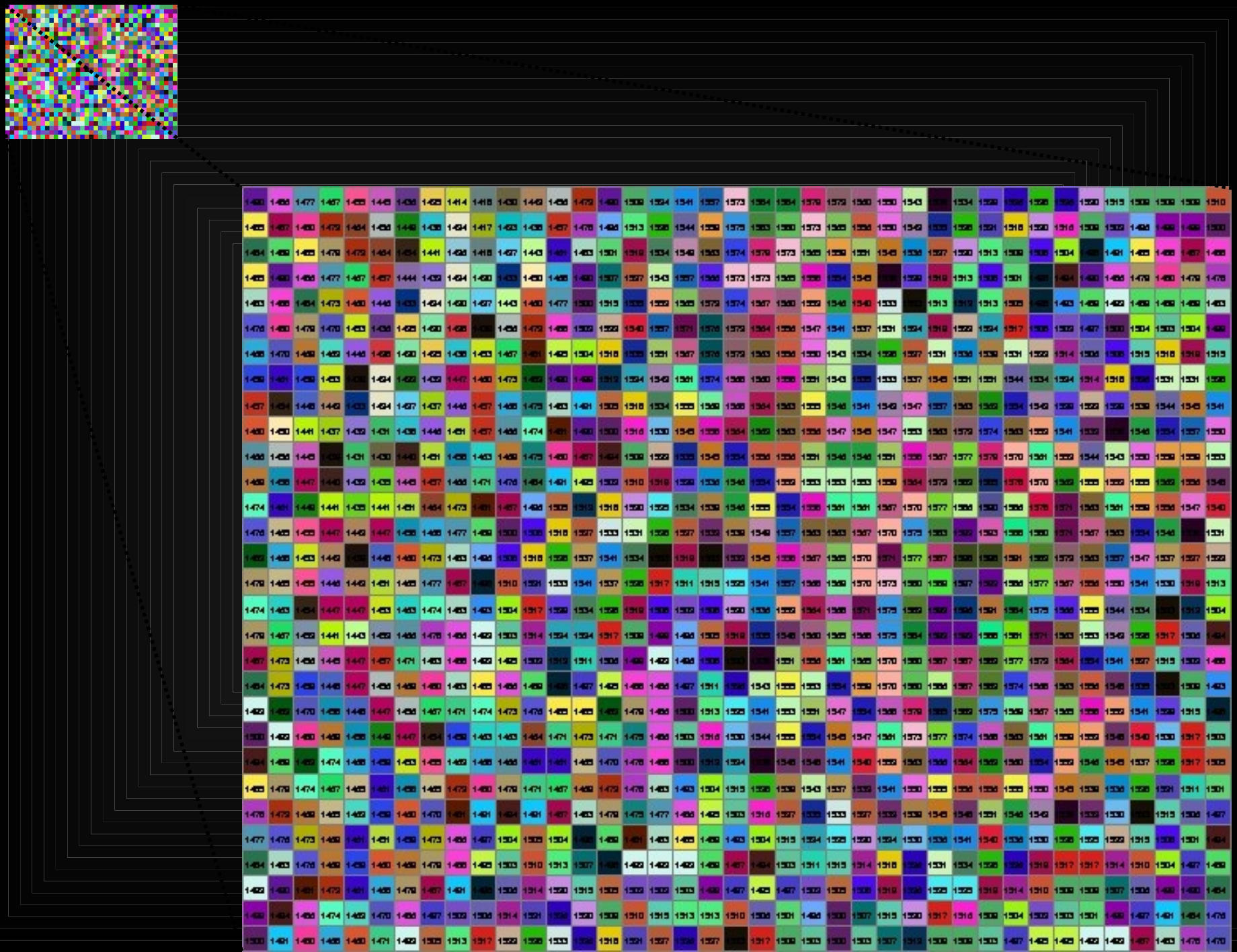
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	cat	X	Y	UNIT	LITHICS	BASALT	POTTERY	BONE	SHELL	CHARCOAL	BOTANICALS	COPROLITES	INSECT_PAR	FOSSIL_SHE	TOTA
2	1	0.250000	0.250000	A	2.840000	0.470000	0.260000	0.280000	0.320000	0.210000	0.010000	0.190000	0.010000	0.670000	0.43
3	2	0.250000	0.750000	B	4.110000	1.210000	0.540000	0.430000	1.870000	0.370000	0.030000	0.160000	0.000000	1.870000	1.16
4	3	0.250000	1.250000	C	2.740000	0.810000	0.490000	0.350000	0.640000	0.320000	0.010000	0.040000	0.010000	0.960000	0.66
5	4	0.250000	1.750000	D	1.520000	0.480000	1.000000	0.150000	0.800000	0.140000	0.050000	0.130000	0.010000	0.770000	0.61
6	5	0.250000	2.250000	E	1.310000	0.490000	0.470000	0.360000	0.910000	0.210000	0.010000	0.090000	0.000000	1.400000	0.80
7	6	0.250000	2.750000	F	5.270000	0.890000	0.320000	0.240000	1.670000	0.380000	0.000000	0.000000	0.000000	1.480000	1.01
8	7	0.250000	3.250000	G	5.680000	0.840000	0.320000	0.090000	0.910000	0.200000	0.000000	0.020000	0.000000	0.720000	0.88
9	8	0.750000	0.250000	H	1.070000	0.650000	0.490000	0.130000	0.290000	0.310000	0.100000	0.510000	0.000000	0.170000	0.39
10	9	0.750000	0.750000	I	2.060000	0.870000	0.910000	0.310000	0.790000	0.370000	0.030000	0.880000	0.000000	0.770000	0.80
11	10	0.750000	1.250000	J	1.420000	0.770000	0.430000	0.330000	0.770000	0.390000	0.040000	0.100000	0.000000	0.540000	0.49
12	11	0.750000	1.750000	K	1.680000	0.750000	0.430000	0.360000	1.130000	0.470000	0.000000	0.150000	0.000000	1.130000	0.63
13	12	0.750000	2.250000	L	0.650000	0.530000	0.500000	0.170000	0.970000	0.270000	0.020000	0.330000	0.000000	1.120000	0.48
14	13	0.750000	2.750000	M	4.060000	0.860000	0.410000	0.270000	1.150000	0.290000	0.000000	0.170000	0.000000	0.680000	0.78
15	14	0.750000	3.250000	N	5.000000	1.000000	1.480000	0.670000	1.100000	0.710000	0.000000	0.140000	0.000000	1.050000	1.11
16	15	1.250000	0.250000	O	0.290000	0.170000	0.100000	0.190000	0.170000	0.210000	0.100000	0.250000	0.000000	0.210000	0.25
17	16	1.250000	0.750000	P	0.710000	0.630000	0.580000	0.310000	0.380000	0.520000	0.000000	0.080000	0.000000	0.830000	0.40
18	17	1.250000	1.250000	Q	1.900000	0.880000	0.480000	0.520000	0.850000	0.600000	0.000000	0.270000	0.020000	0.790000	0.64
19	18	1.250000	1.750000	R	1.420000	0.930000	0.470000	0.620000	1.280000	0.620000	0.030000	0.030000	0.000000	1.080000	0.65
20	19	1.250000	2.250000	S	1.930000	0.720000	0.820000	0.320000	1.090000	0.700000	0.000000	0.000000	0.000000	1.040000	0.70
21	20	1.250000	2.750000	T	2.260000	0.620000	0.100000	0.130000	0.310000	0.310000	0.000000	0.000000	0.000000	0.560000	0.49
22	21	1.250000	3.250000	U	1.330000	0.840000	1.240000	0.310000	0.780000	0.180000	0.040000	1.430000	0.000000	0.860000	0.76
23	22	1.750000	0.250000	V	0.520000	0.150000	0.730000	0.080000	0.230000	0.170000	0.040000	0.230000	0.000000	0.100000	0.27
24	23	1.750000	0.750000	W	0.830000	0.670000	0.900000	0.210000	0.710000	0.260000	0.020000	0.380000	0.000000	0.430000	0.55
25	24	1.750000	1.250000	X	0.140000	0.120000	0.360000	0.100000	0.330000	0.210000	0.000000	0.070000	0.000000	0.290000	0.19
26	25	1.750000	1.750000	Y	0.600000	0.950000	0.520000	0.240000	0.500000	0.290000	0.000000	0.000000	0.000000	0.980000	0.42
27	26	1.750000	2.250000	Z	0.380000	0.290000	0.250000	0.060000	0.230000	0.250000	0.000000	0.060000	0.000000	0.190000	0.17
28	27	1.750000	2.750000	AA	1.780000	0.910000	1.290000	0.360000	0.560000	0.600000	0.020000	0.000000	0.000000	1.360000	0.70
29	28	1.750000	3.250000	BB	1.740000	0.330000	0.590000	0.130000	0.330000	0.310000	0.000000	0.000000	0.000000	0.720000	0.42
30	29	2.250000	0.250000	CC	0.780000	0.440000	0.810000	0.470000	0.530000	0.280000	0.000000	0.000000	0.000000	1.060000	0.48
31	30	2.250000	0.750000	DD	1.110000	0.360000	0.530000	0.720000	0.360000	0.170000	0.000000	0.000000	0.030000	0.640000	0.41
32	31	2.250000	1.250000	EE	0.310000	0.050000	0.590000	0.130000	0.000000	0.080000	0.000000	0.000000	0.000000	0.130000	0.13
33	32	2.250000	1.750000	FF	1.000000	0.600000	0.440000	0.290000	0.580000	0.310000	0.000000	0.000000	0.000000	0.620000	0.38

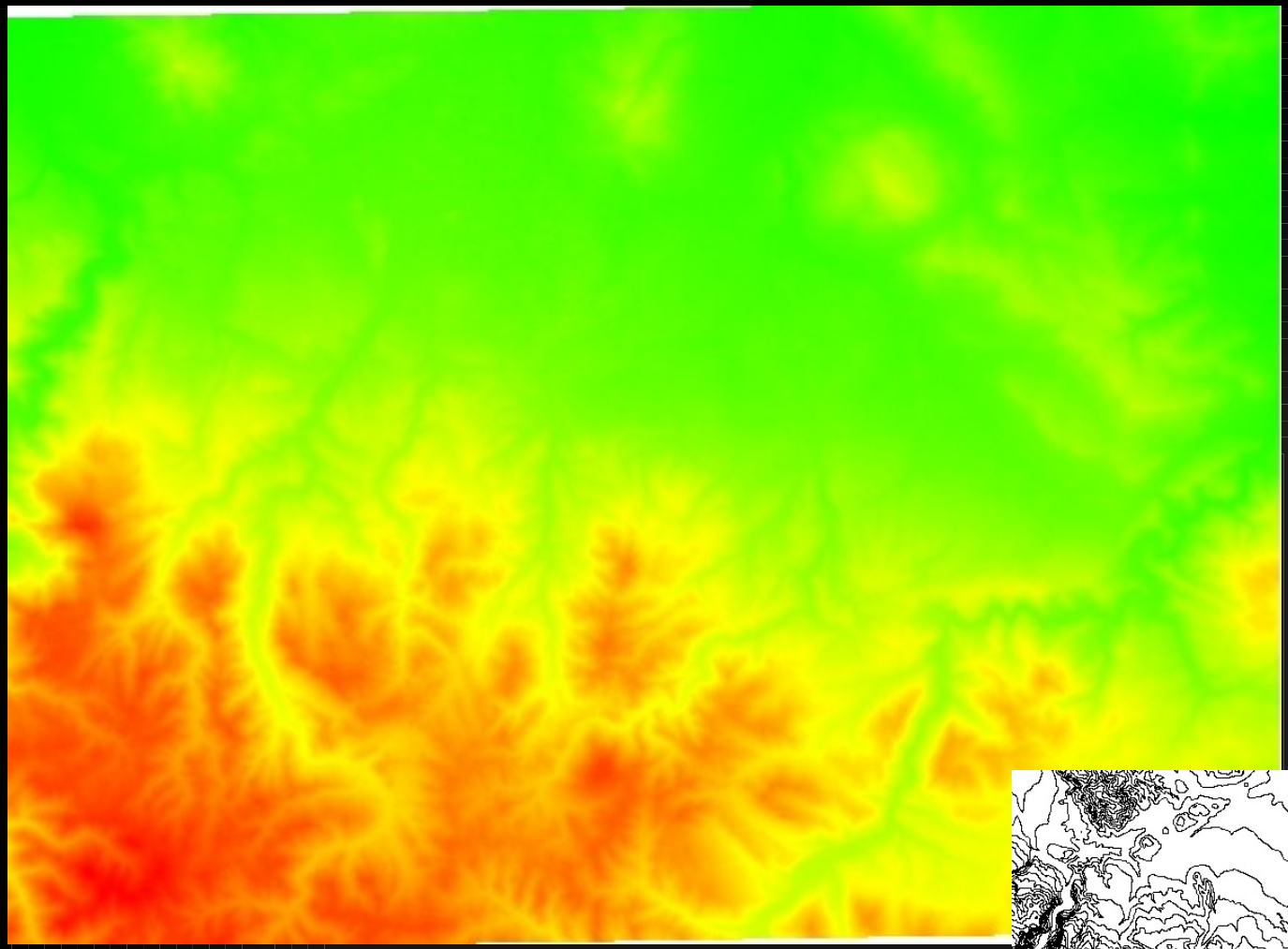
g34_microartifacts_points

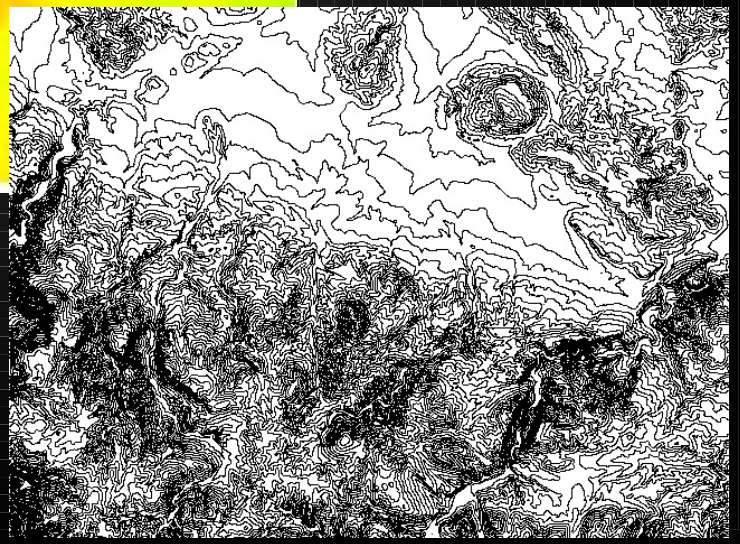
Ready











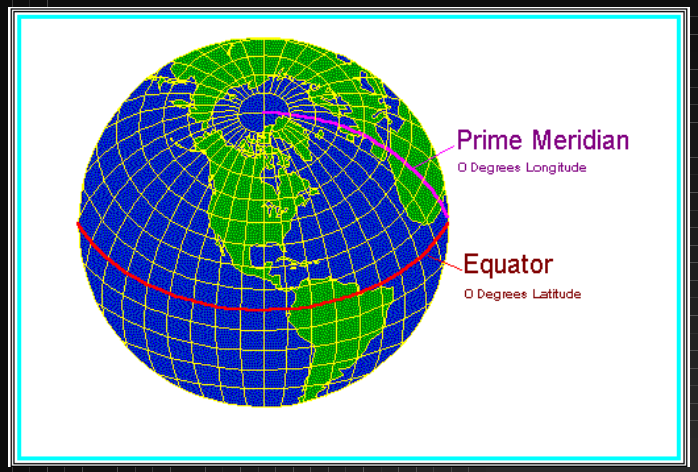
A Quick Note on Projections

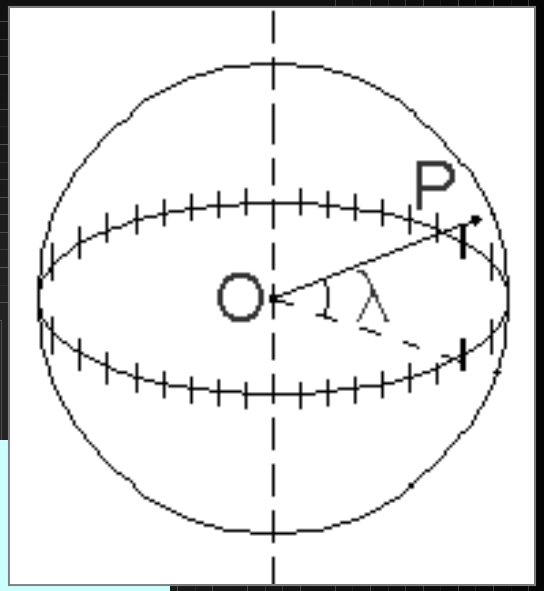
- Maps are flat representations of a round world
- Different projections are different ways to mathematically “unbend” curvilinear distances into flat distances
- Projections also have different Datum point from which all measurements are tied back to the Earth
- While you have absolutely no need to know how or why projections work, you should know about two of the major types and what the difference between them are.

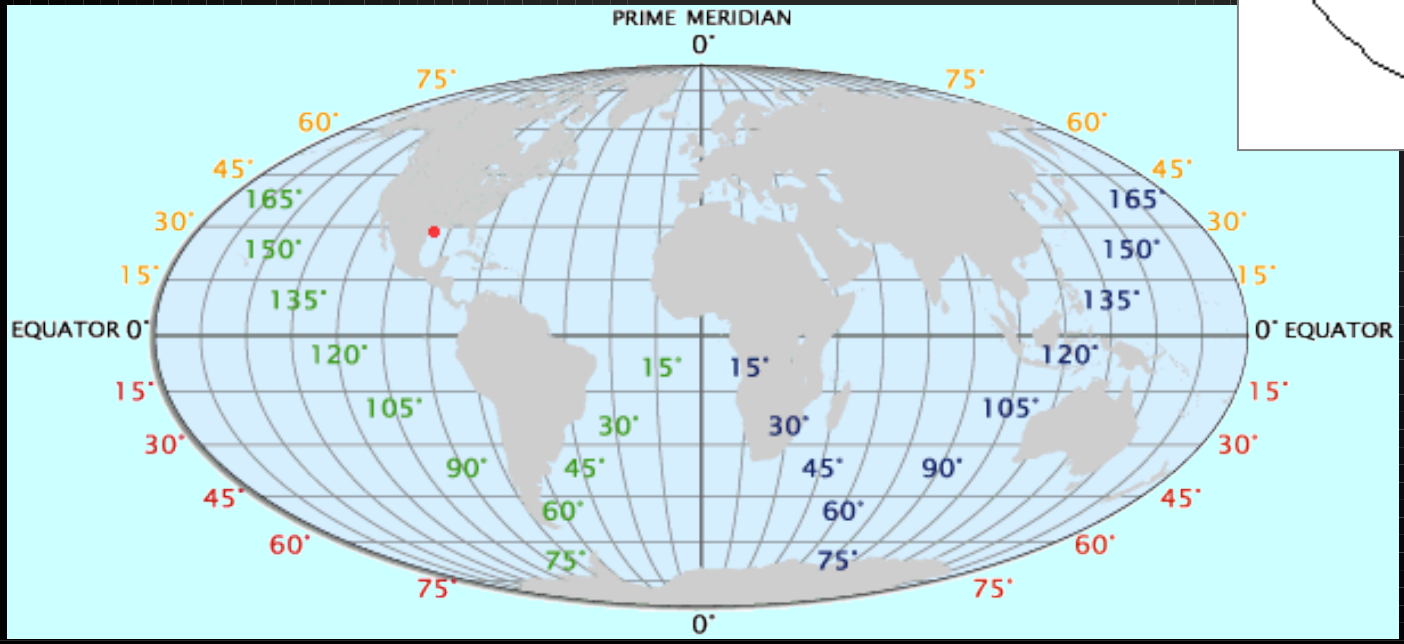
A Quick Note on Projections

- One is the Latitude/Longitude (Lat/Lon) projection, and it works worldwide
- However, all distances in this type of projection are measured as fractions of the Earths diameter (degrees, minutes, and seconds or decimal degrees)
- The other is the Universal Transverse Mercator (UTM) projection, which is broken up into a series of zones across the world
- It's units are meters, but you must stay within only the correct zone, or your data will become distorted

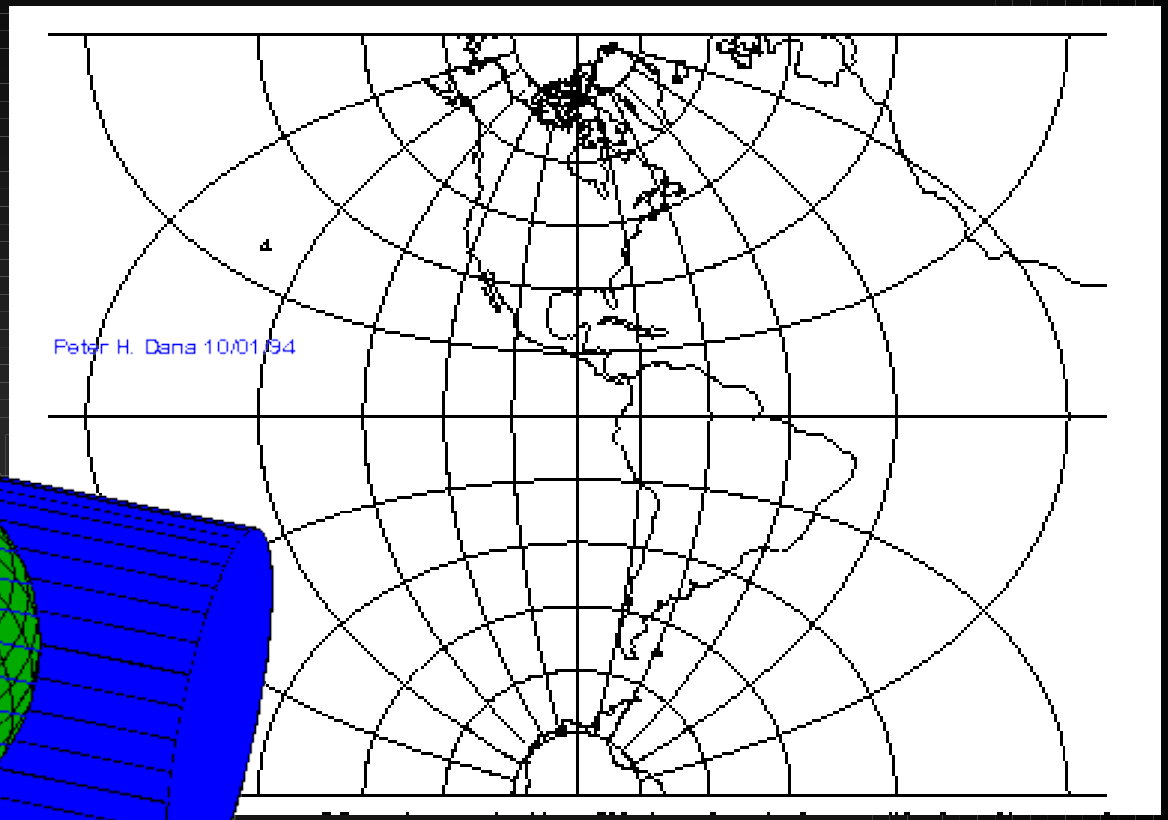
Lat/Lon Projection

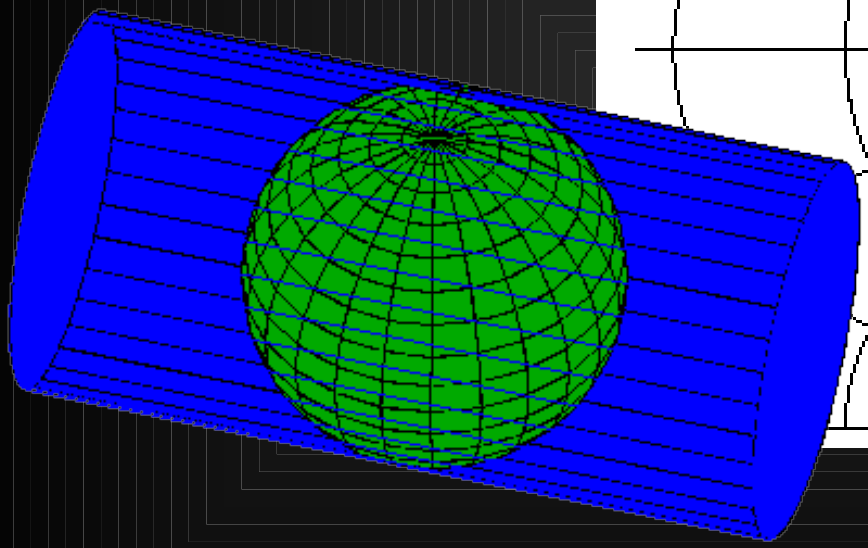






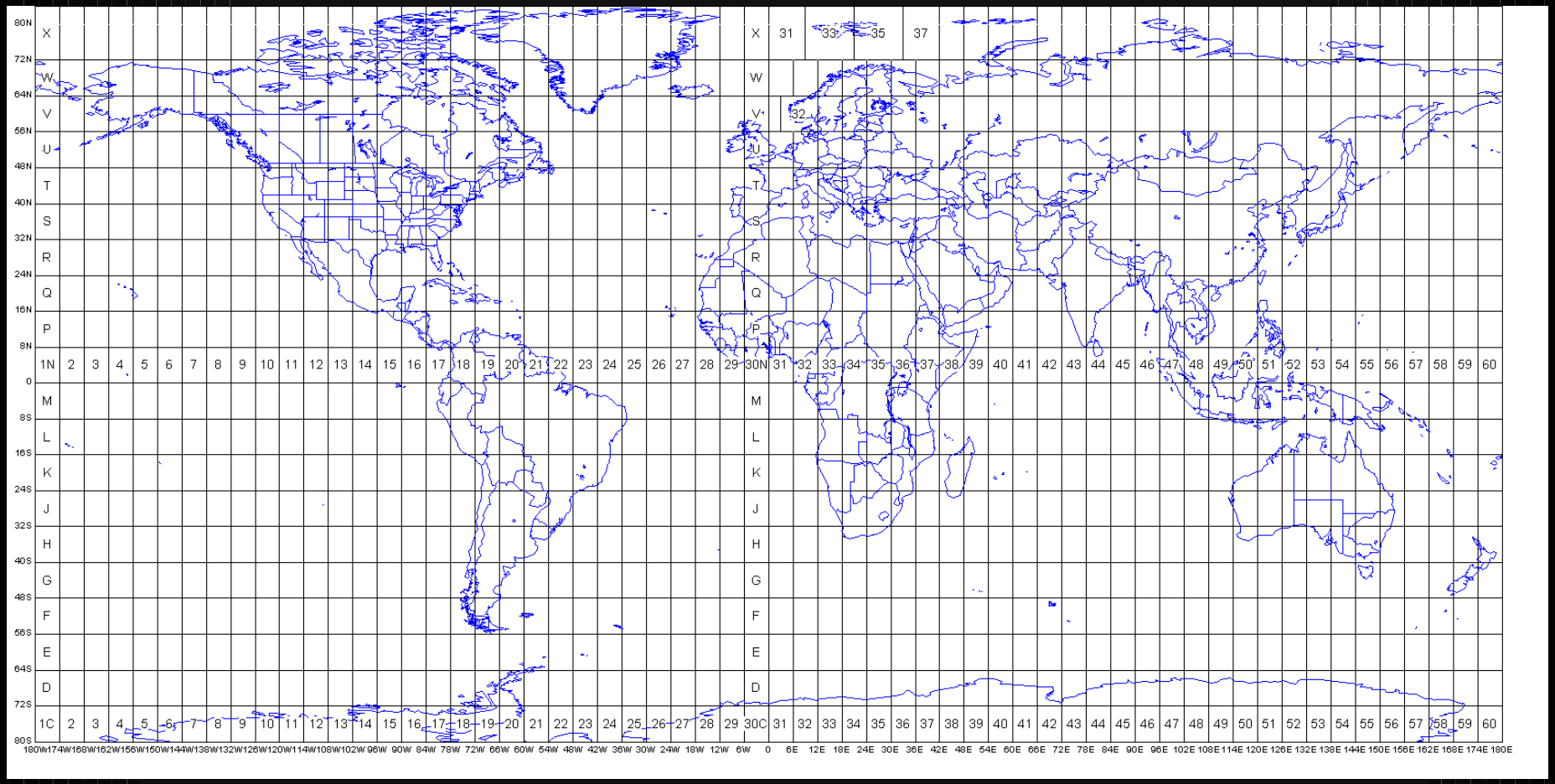
UTM Projection





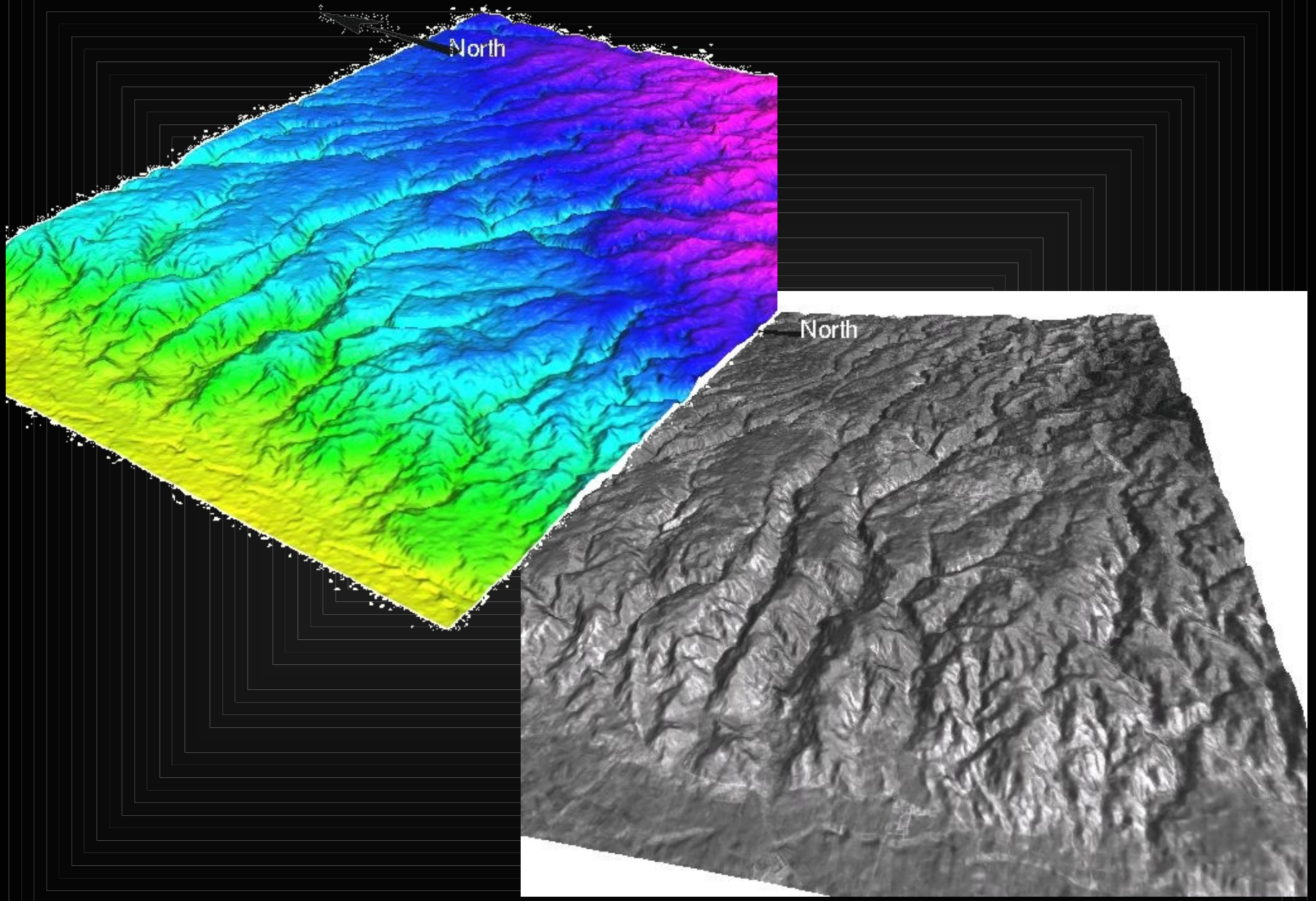
Transverse Cylindrical
Projection Surface

UTM Zones


80N
72N
64N
56N
48N
40N
32N
24N
16N
8N
0
8S
16S
24S
32S
40S
48S
56S
64S
72S
80S
X W V U T S R Q P
1N 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30N 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
M L K J H G F E D
1C 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30C 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
180W 174W 168W 162W 156W 150W 144W 138W 132W 126W 120W 114W 108W 102W 96W 90W 84W 78W 72W 66W 60W 54W 48W 42W 36W 30W 24W 18W 12W 6W 0 6E 12E 18E 24E 30E 36E 42E 48E 54E 60E 66E 72E 78E 84E 90E 96E 102E 108E 114E 120E 126E 132E 138E 144E 150E 156E 162E 168E 174E 180E

And now… a teaser!

0
0.0137174
degrees
N
589
450
310
171
32


North
North

Map of Sherd Density Index
Overlayed on Wall Height Contour

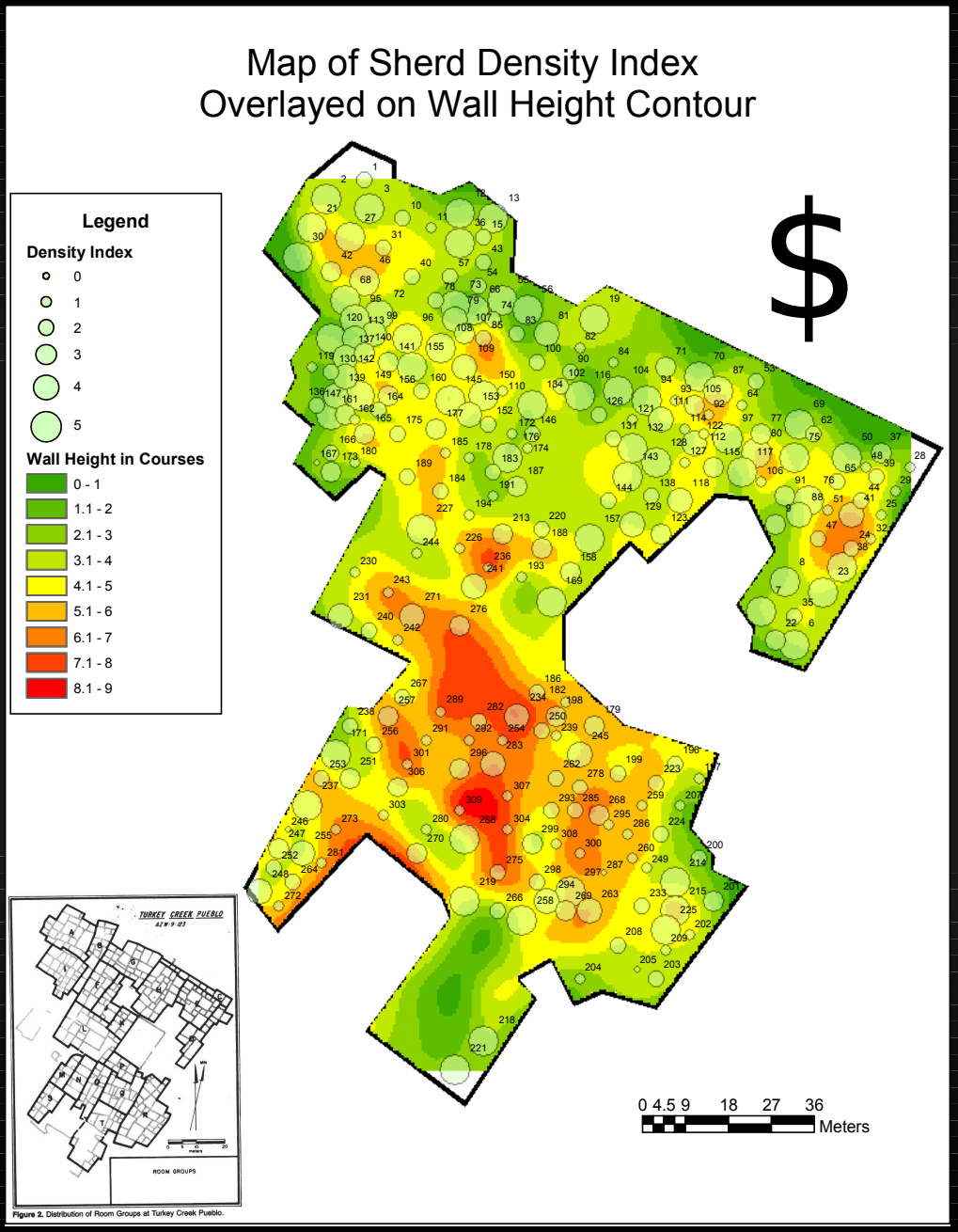
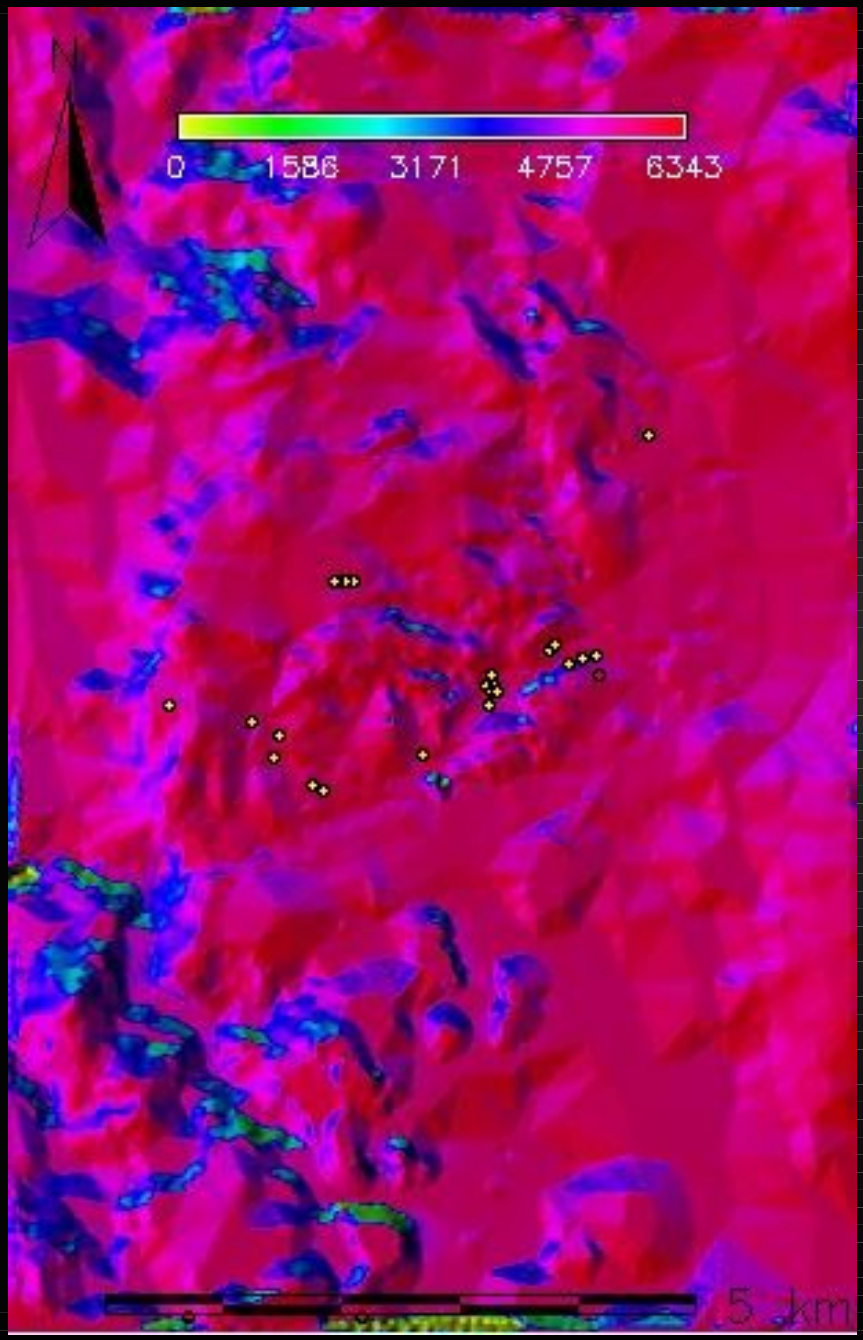
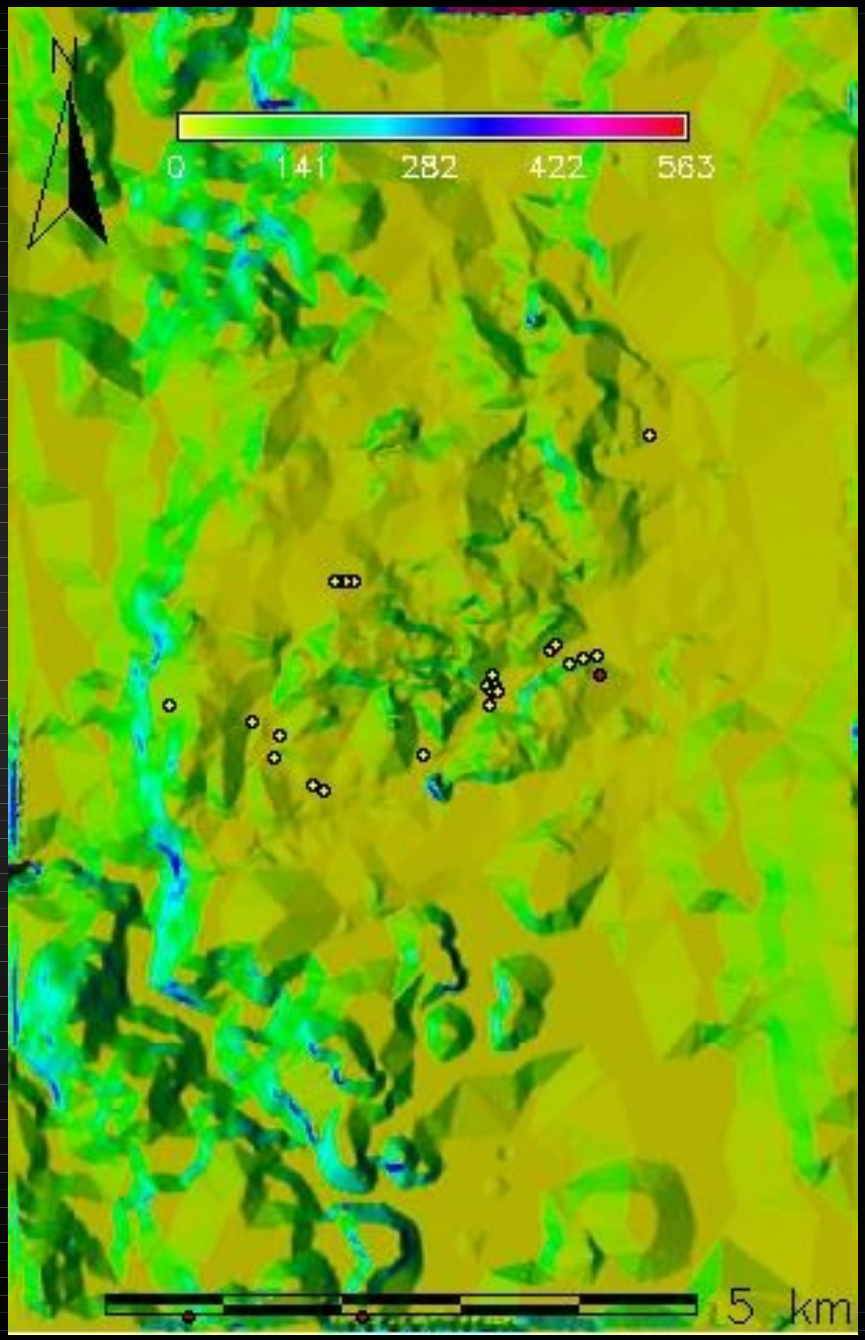
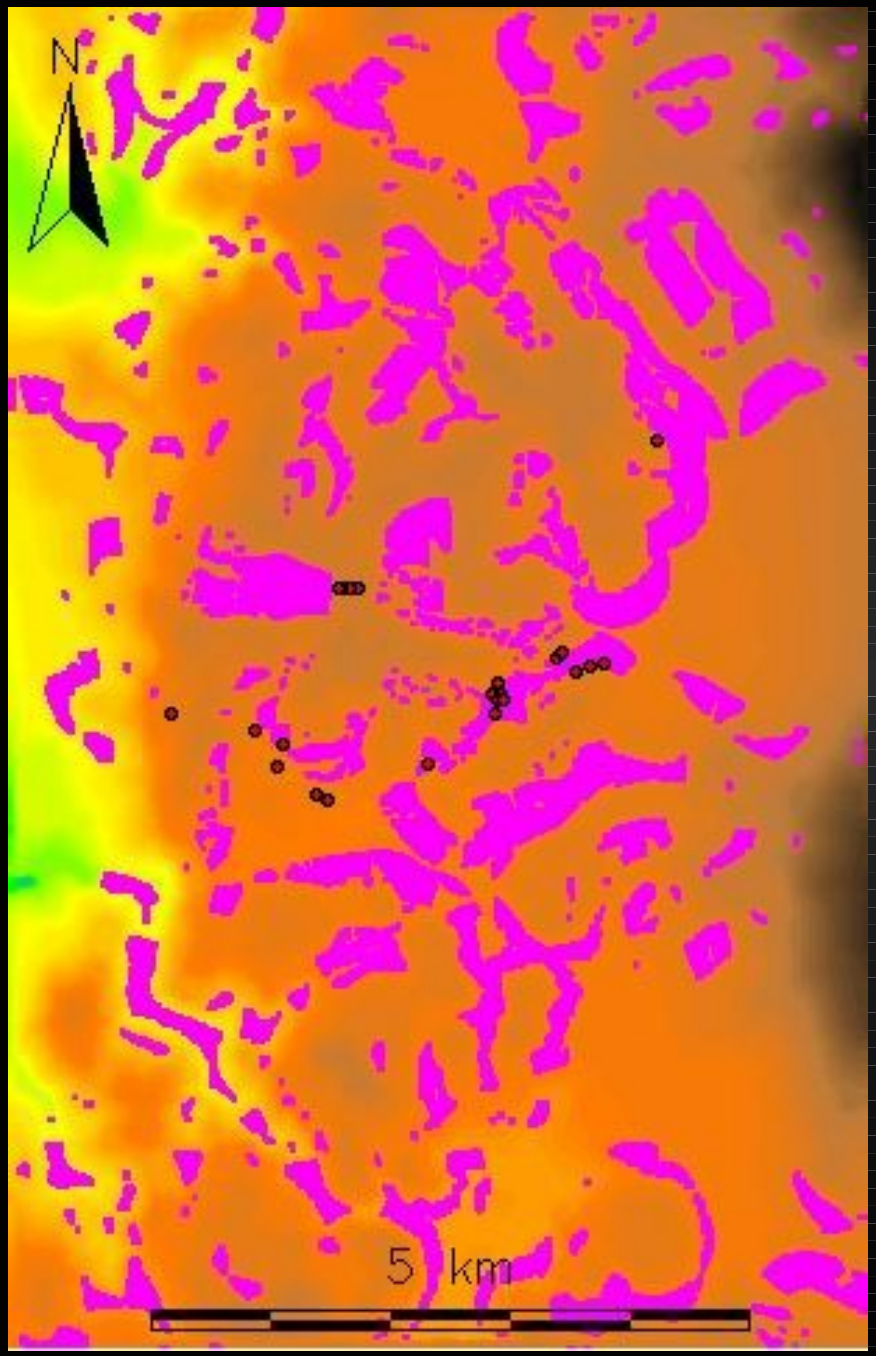
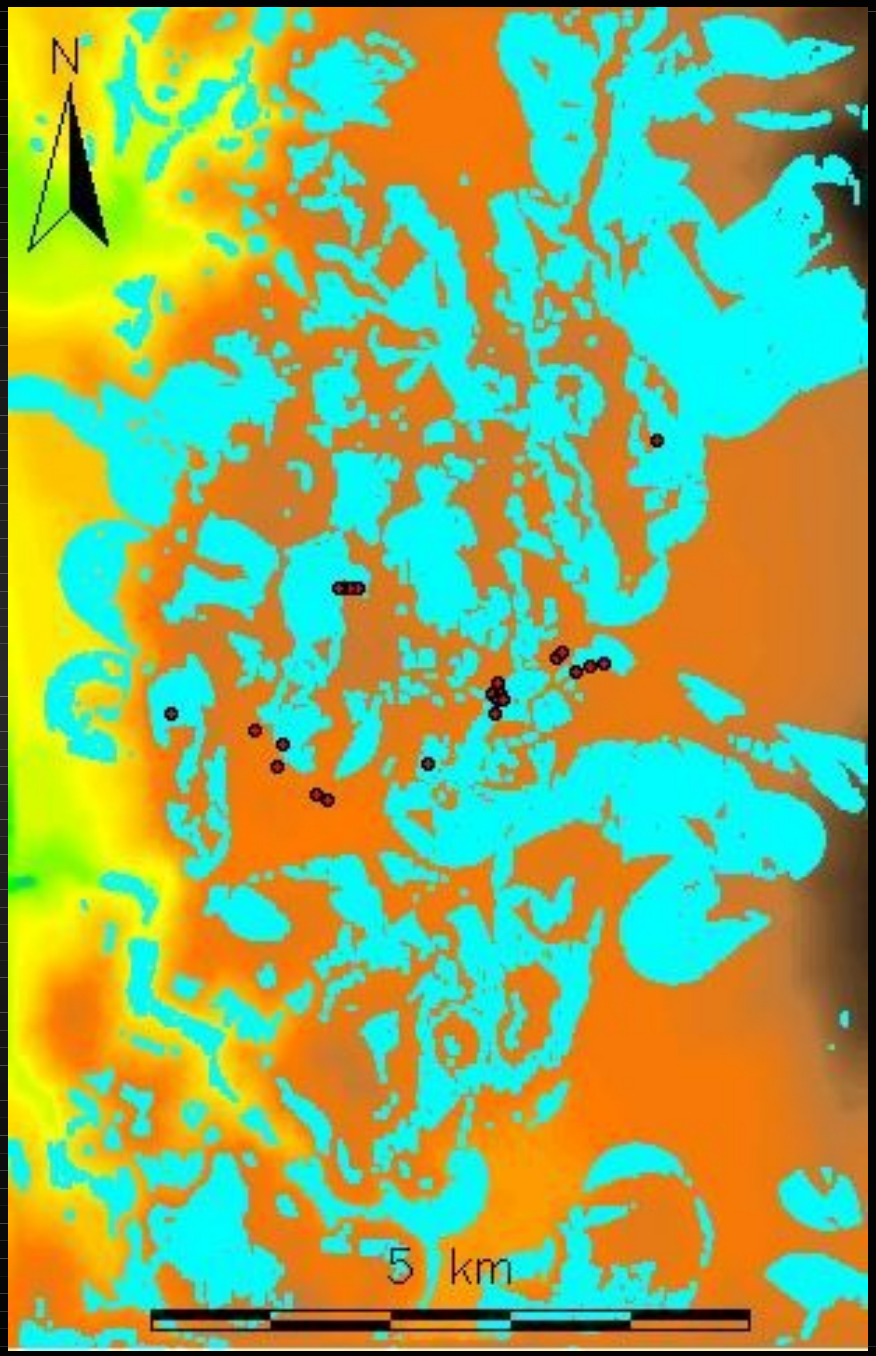


Figure 2. Distribution of Room Groups at Turkey Creek Pueblo.


0
1586
3171
4757
6343
5 km


0
141
282
422
563
5 km


N
5 km


N
5 km

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