Lab 4 Spatial Interpolation

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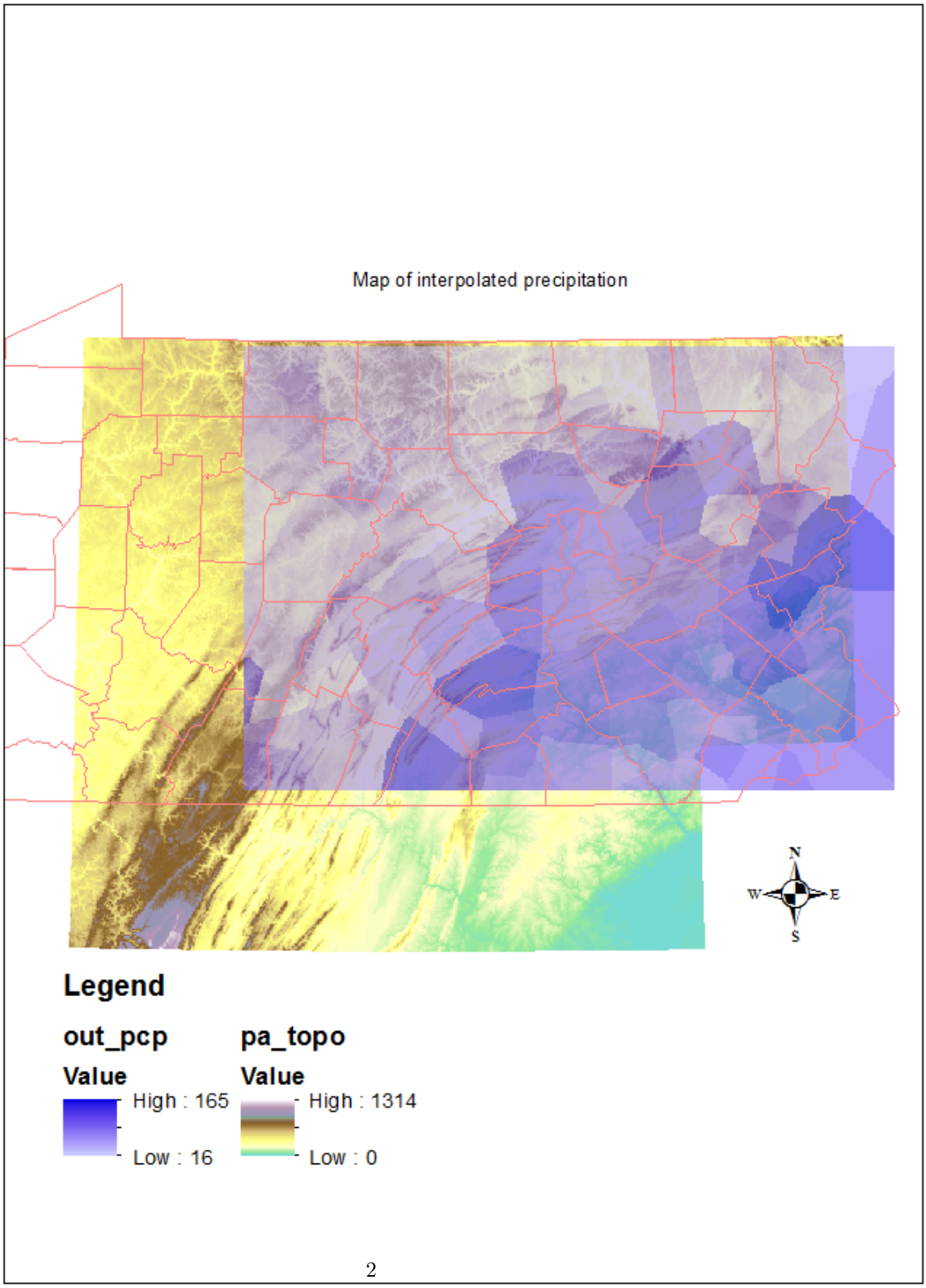
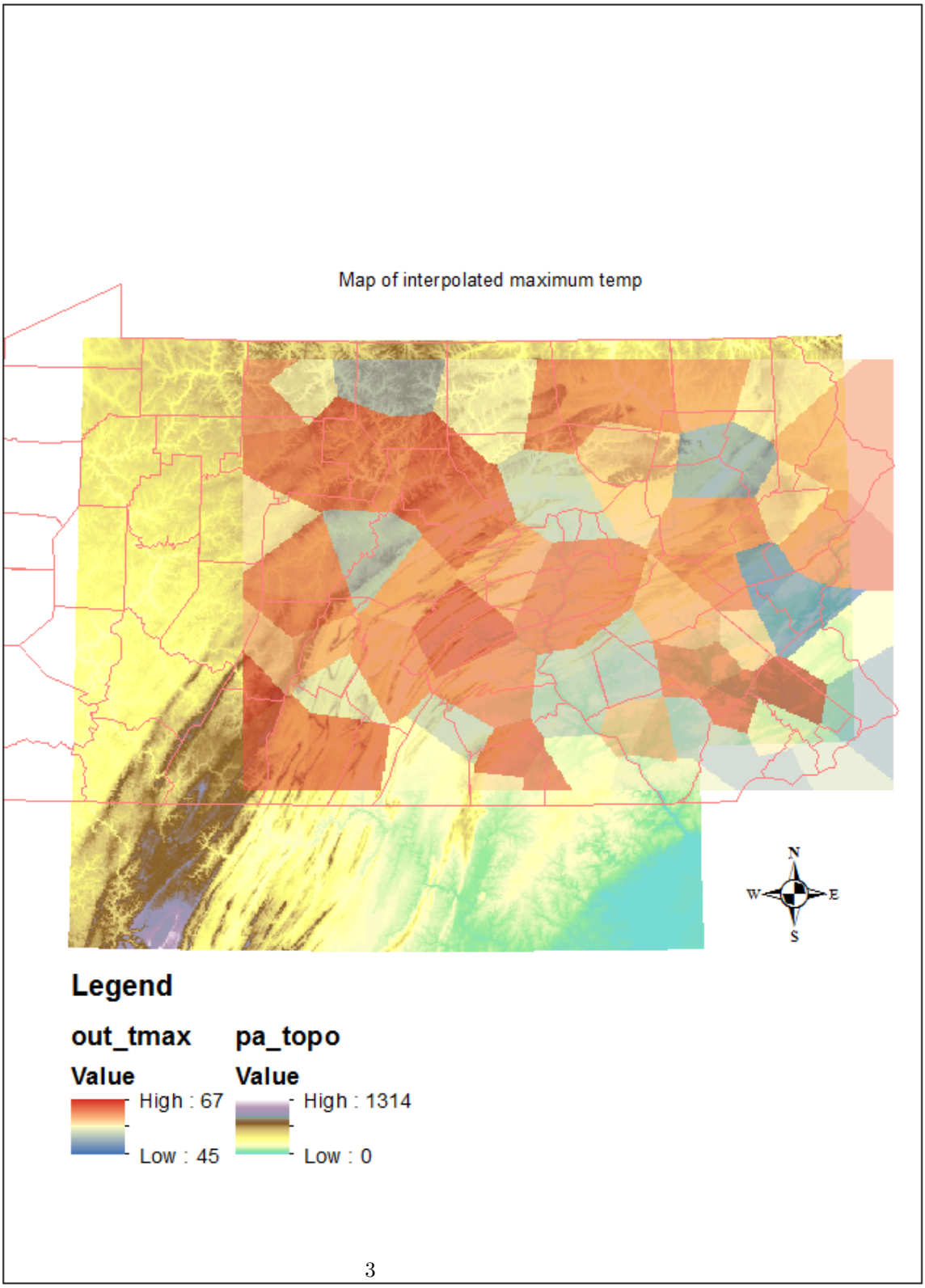
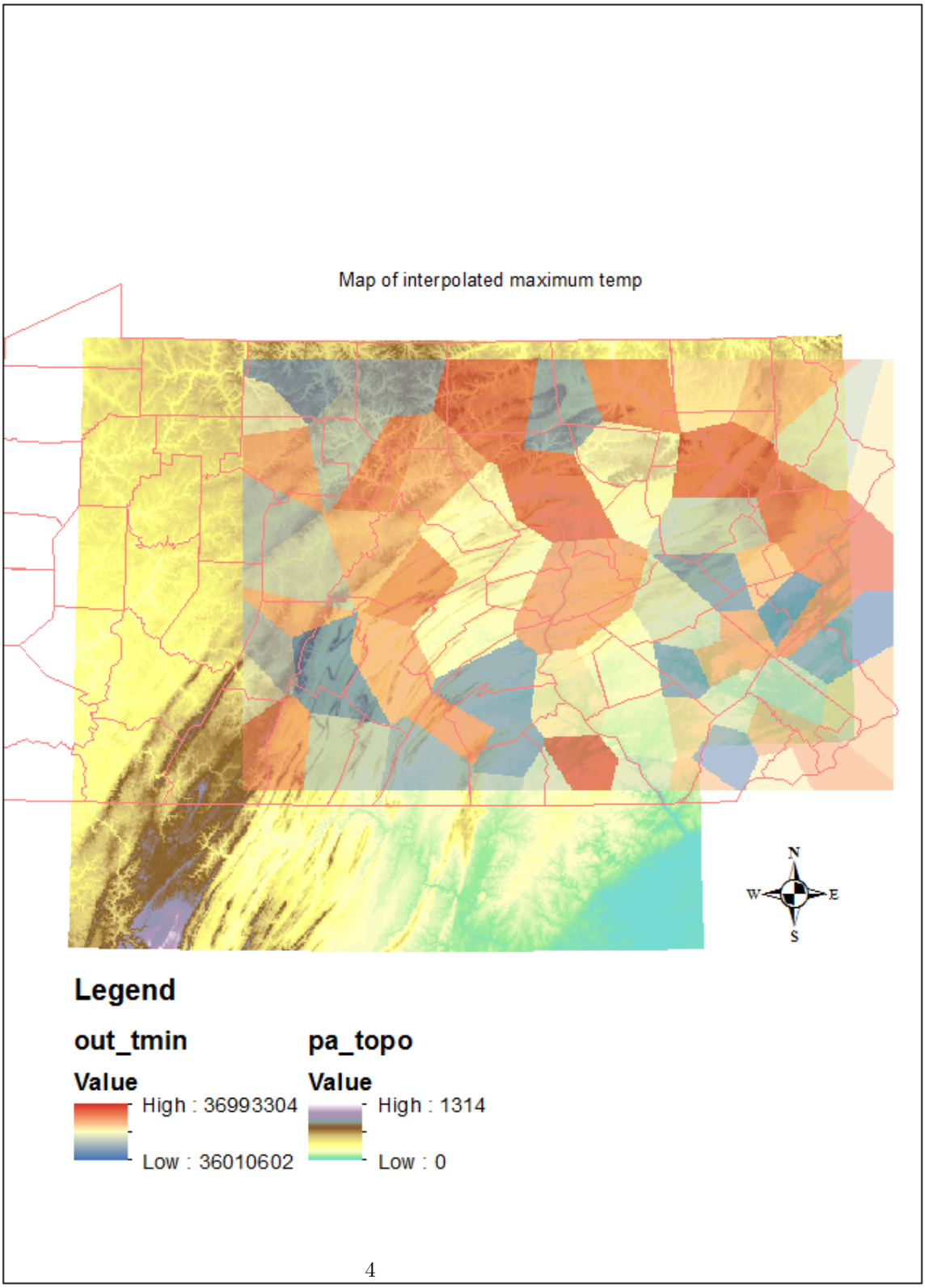
Contents

1 Assignment I: Allocation Analysis

The allocation maps for precipitation, maximum temperature, and minimum temperature are found in figures 1, 2, and 3 respectively. Since all three of these variables are probably distributed continuously accross the landscape the non-smooth allocation is probably a poor interpolation near the edges of the polygons.


Map of interpolated precipitation
N
W
E
S
Legend
out_pcp
Value
High : 165
Low : 16
pa_topo
Value
High : 1314
Low : 0

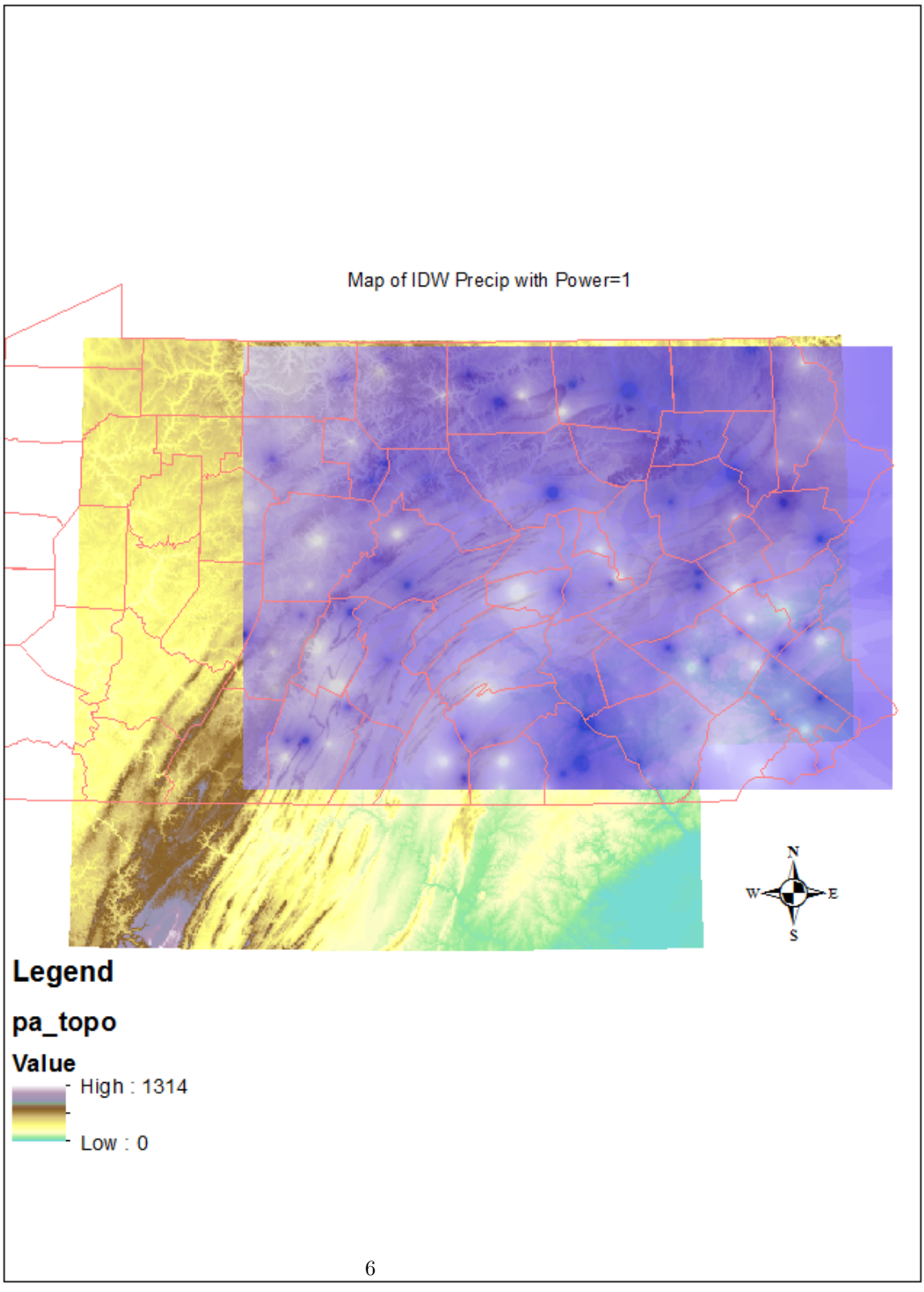

Map of interpolated maximum temp
N
W
E
S
Legend
out_tmax
Value
High : 67
Low : 45
pa_topo
Value
High : 1314
Low : 0

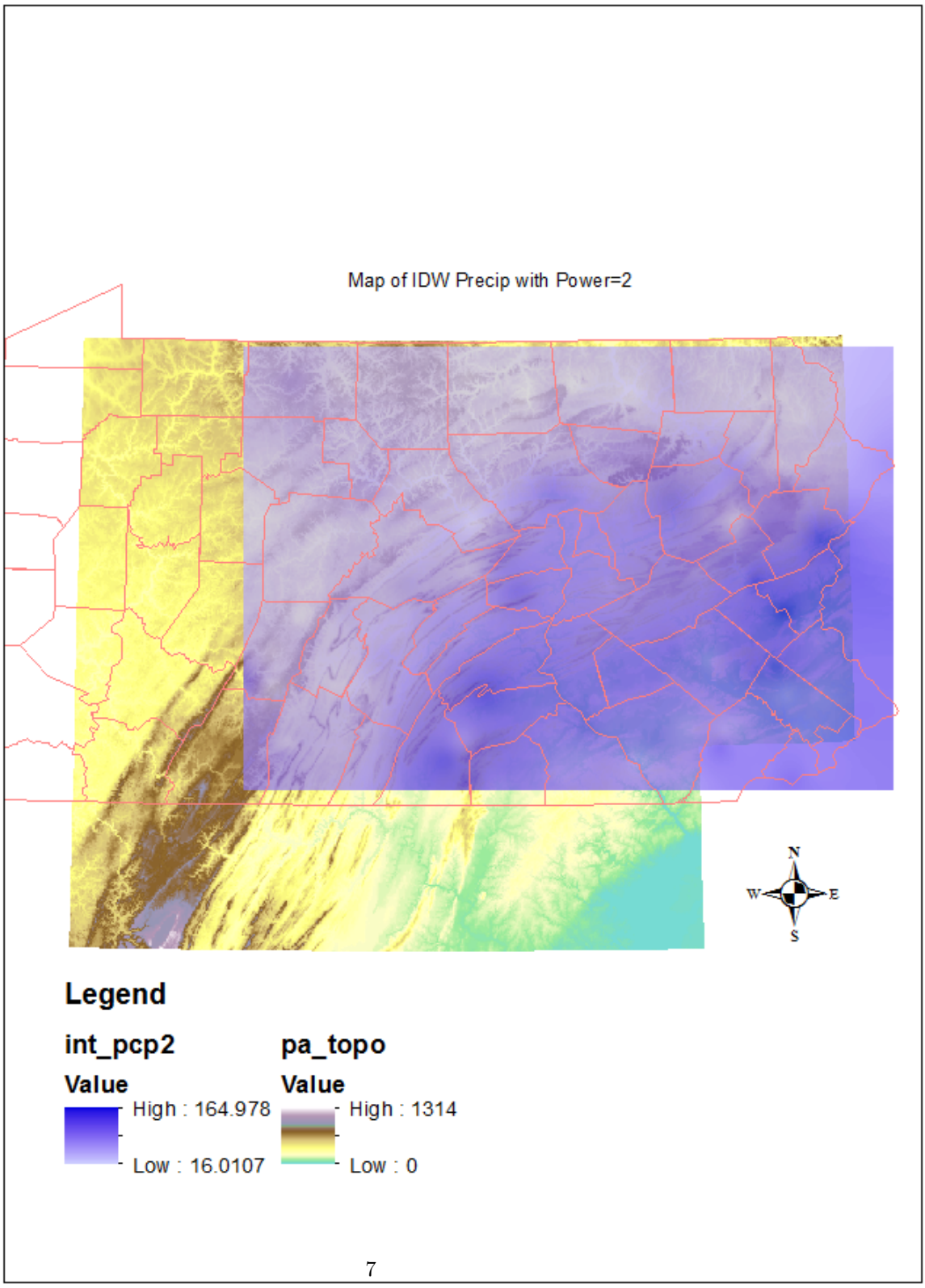

Map of interpolated maximum temp
N
W
E
S
Legend
out_tmin
Value
High : 36993304
Low : 36010602
pa_topo
Value
High : 1314
Low : 0

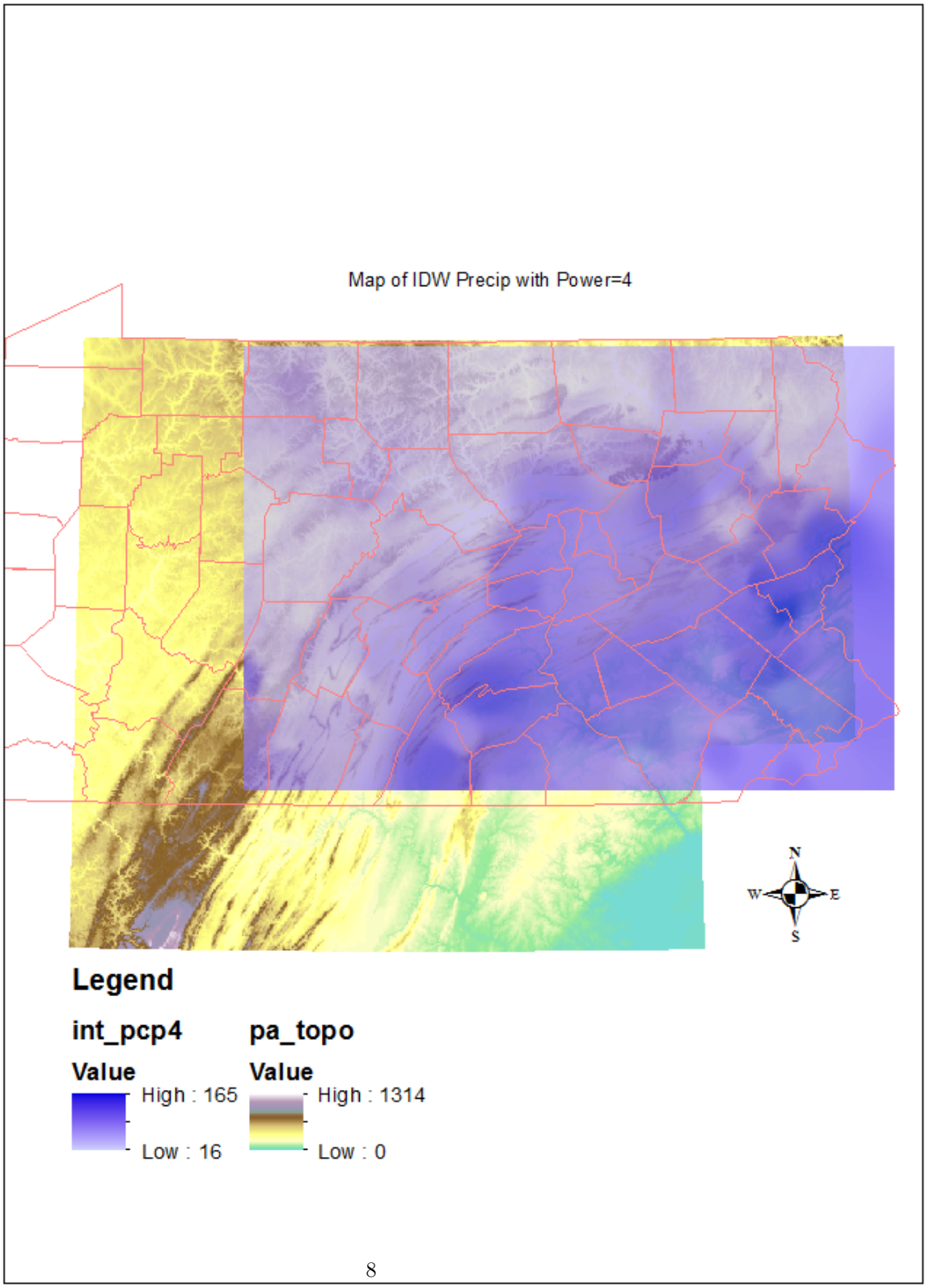
2 Assignment II: Inverse Distance Weighting

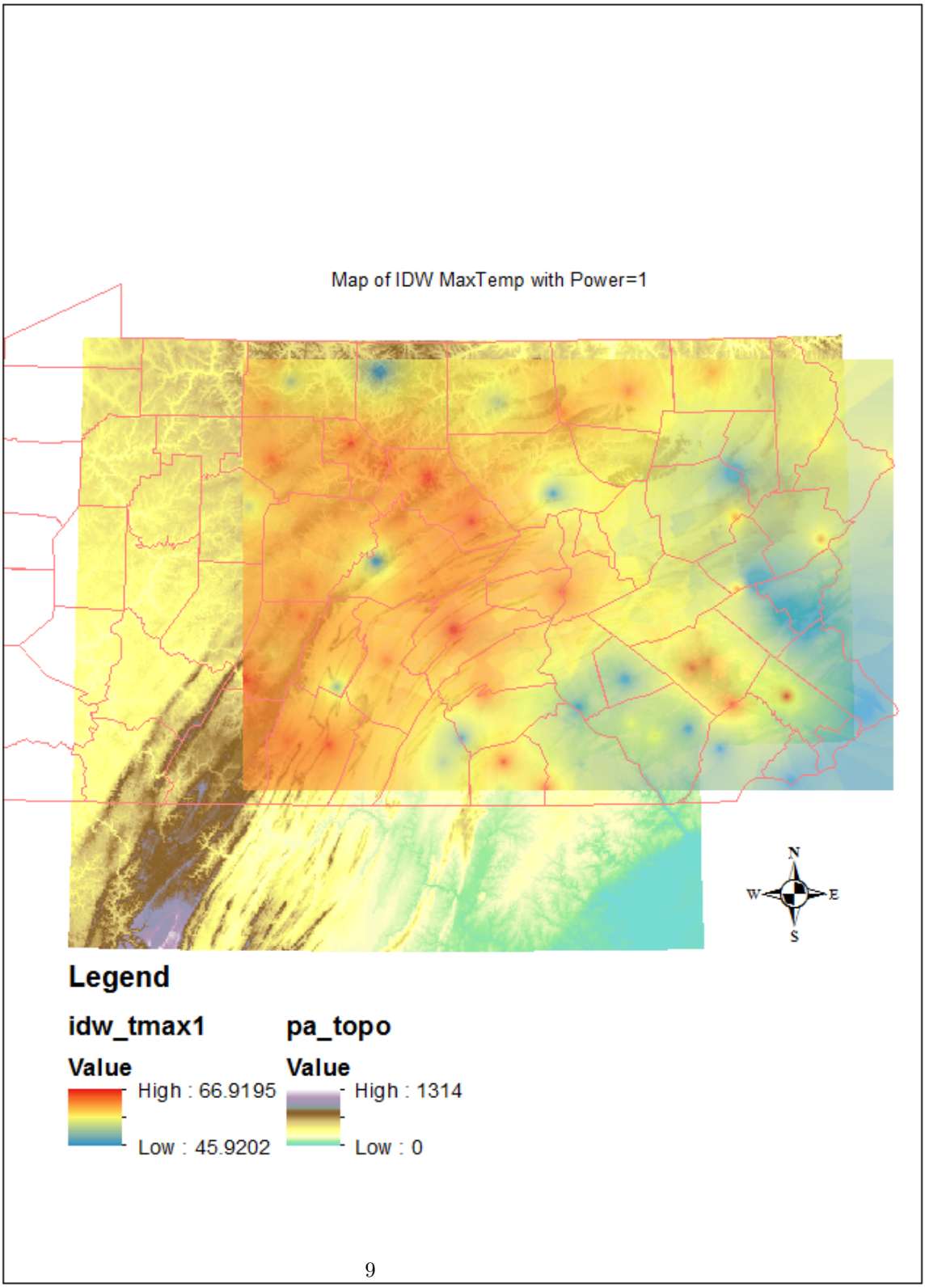
I used three different powers for the inverse distance weighting, 1, 3, and 4 (figs. 4, 5, and 6). The best power for precipitation appeared to be 2 (the default). At small power there appeared to be too much weight immediately adjacent to weather stations and the surface was too rough. At a power=2 the surface appeared to be smoother and the trend in precipitation was more clearly represented. Power=4 appeared to create a patchy surface.

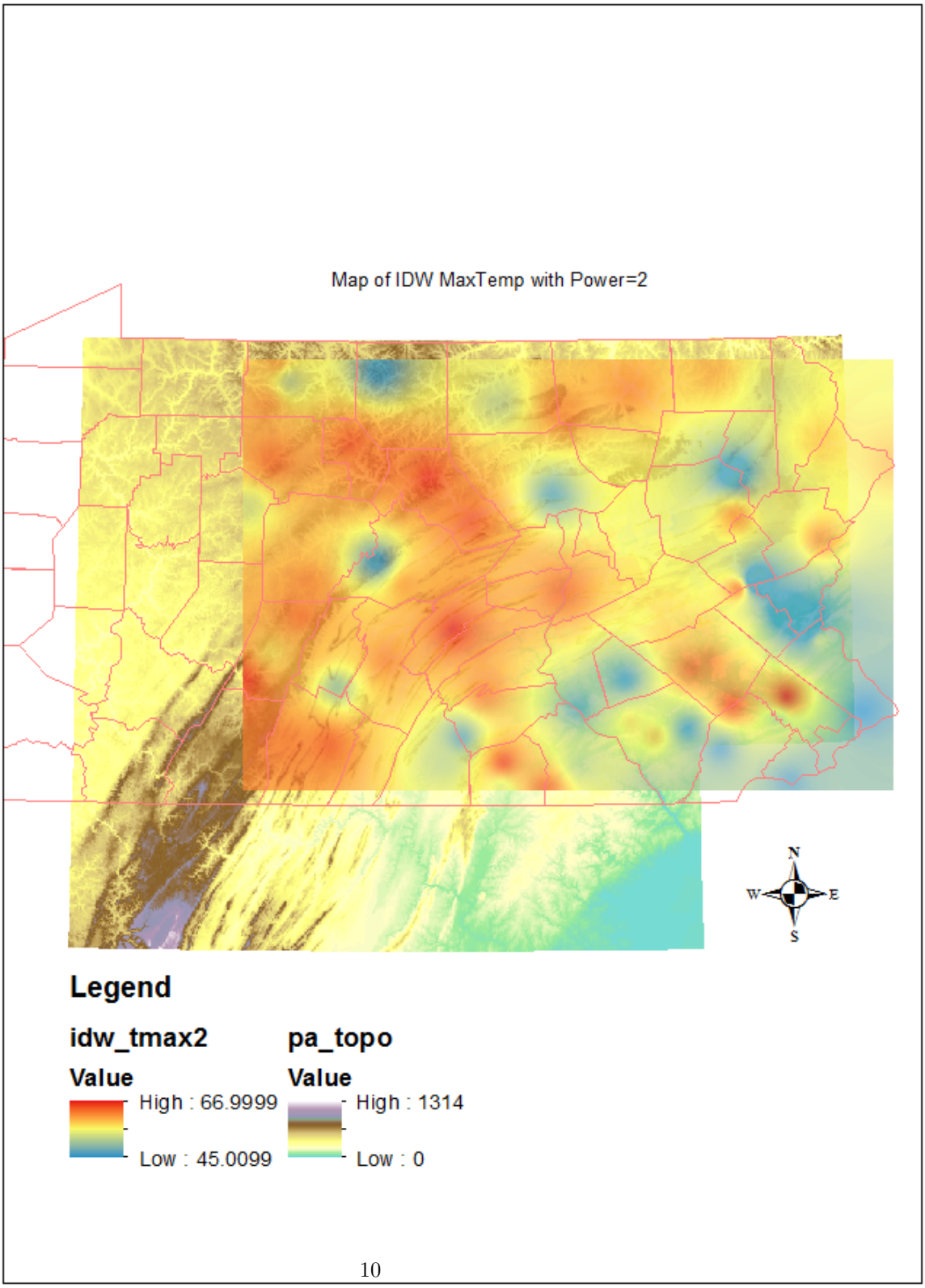
For temperature power=1 appeared to be the best option I tried, althoug in hindsight I should have tried a fractional power such as .5 since there are still identifiable weather stations with power 1. However, even with power 1 it is clear that the high elevation areas have both higher max temperatures (7) and lower min temperatures (10).

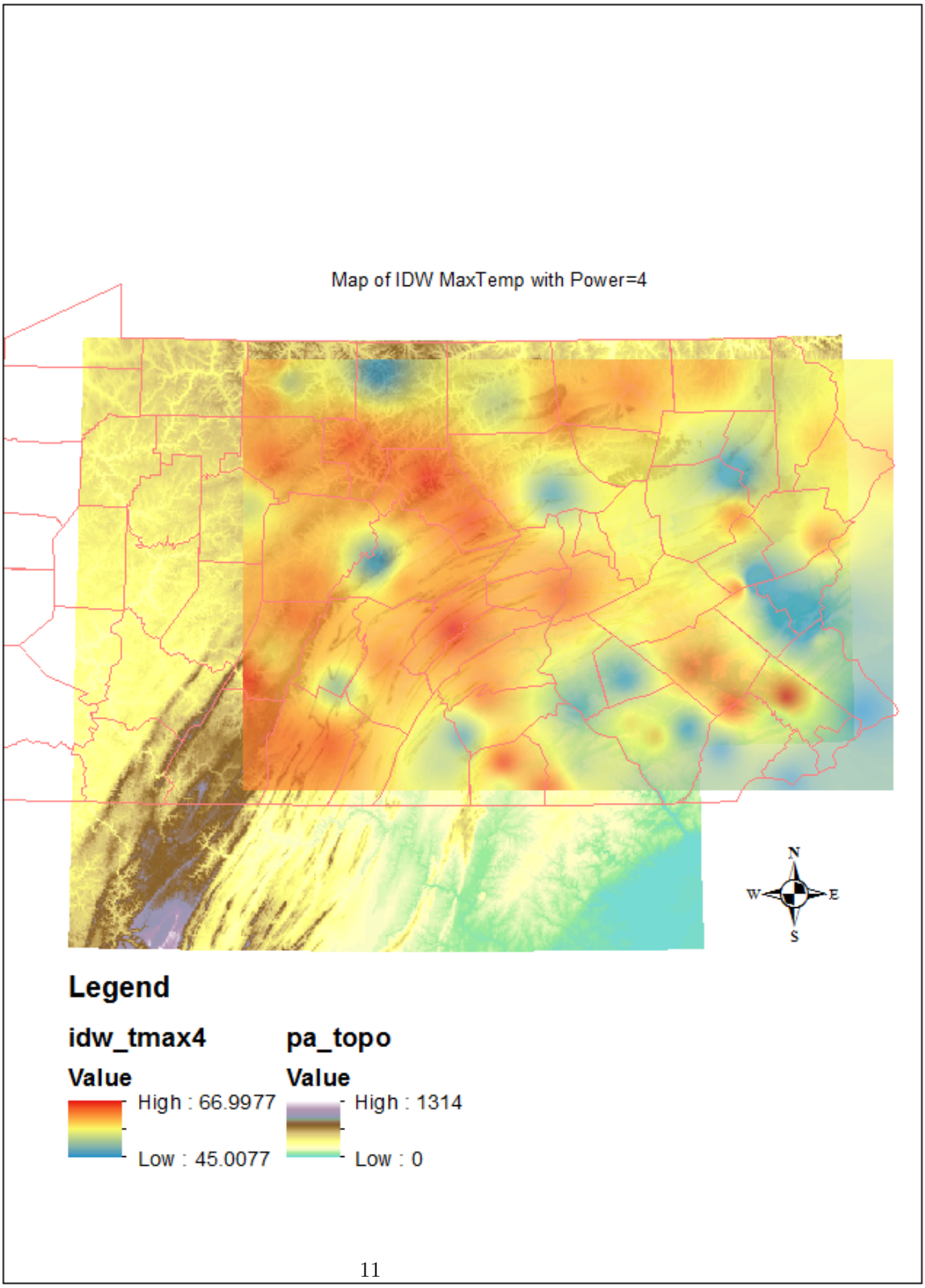

Map of IDW Precip with Power=1
N
W
E
S
Legend
pa_topo
Value
High : 1314
Low : 0

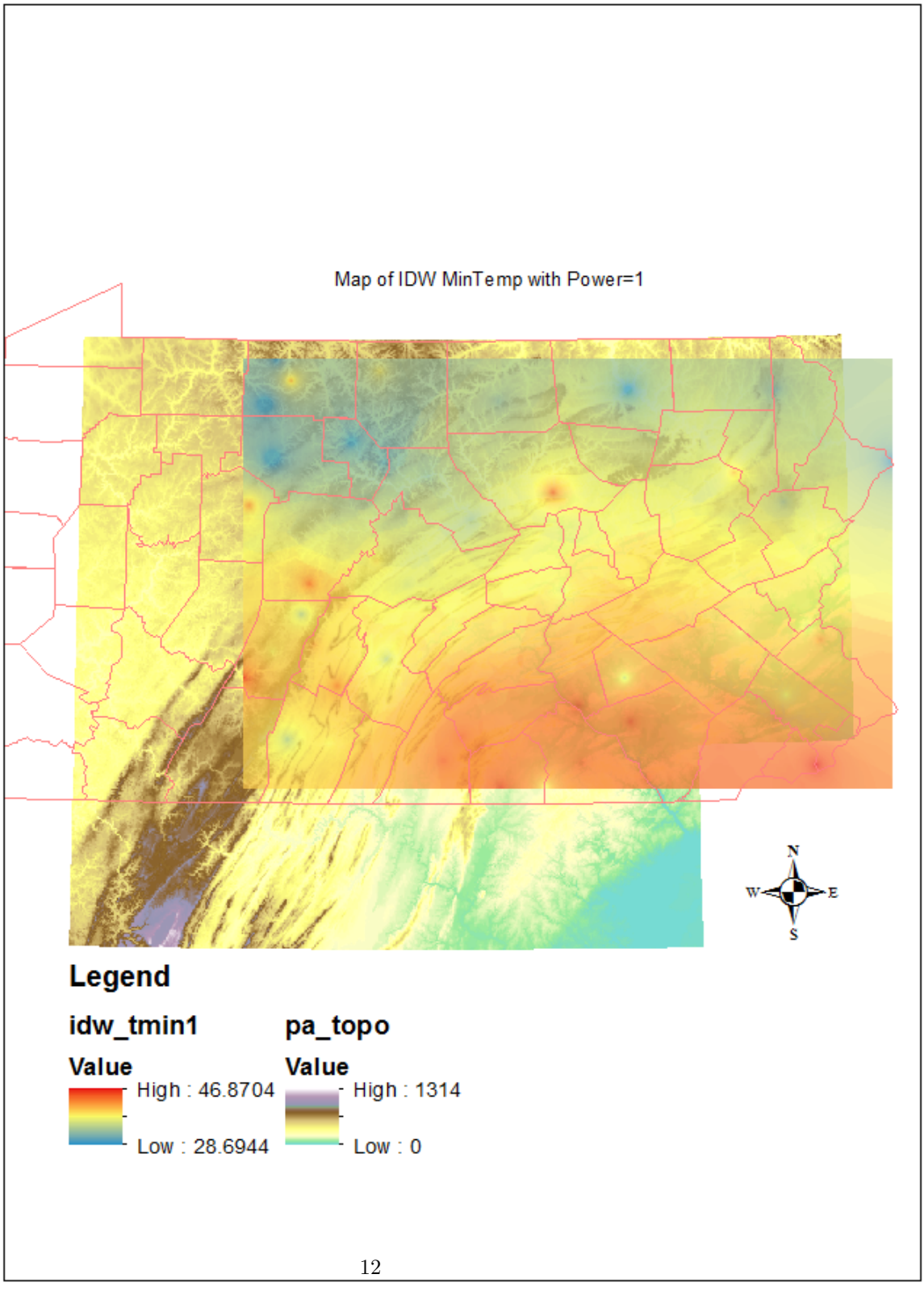

Map of IDW Precip with Power=2
N
W
E
S
Legend
int_pcp2
Value
High : 164.978
Low : 16.0107
pa_topo
Value
High : 1314
Low : 0

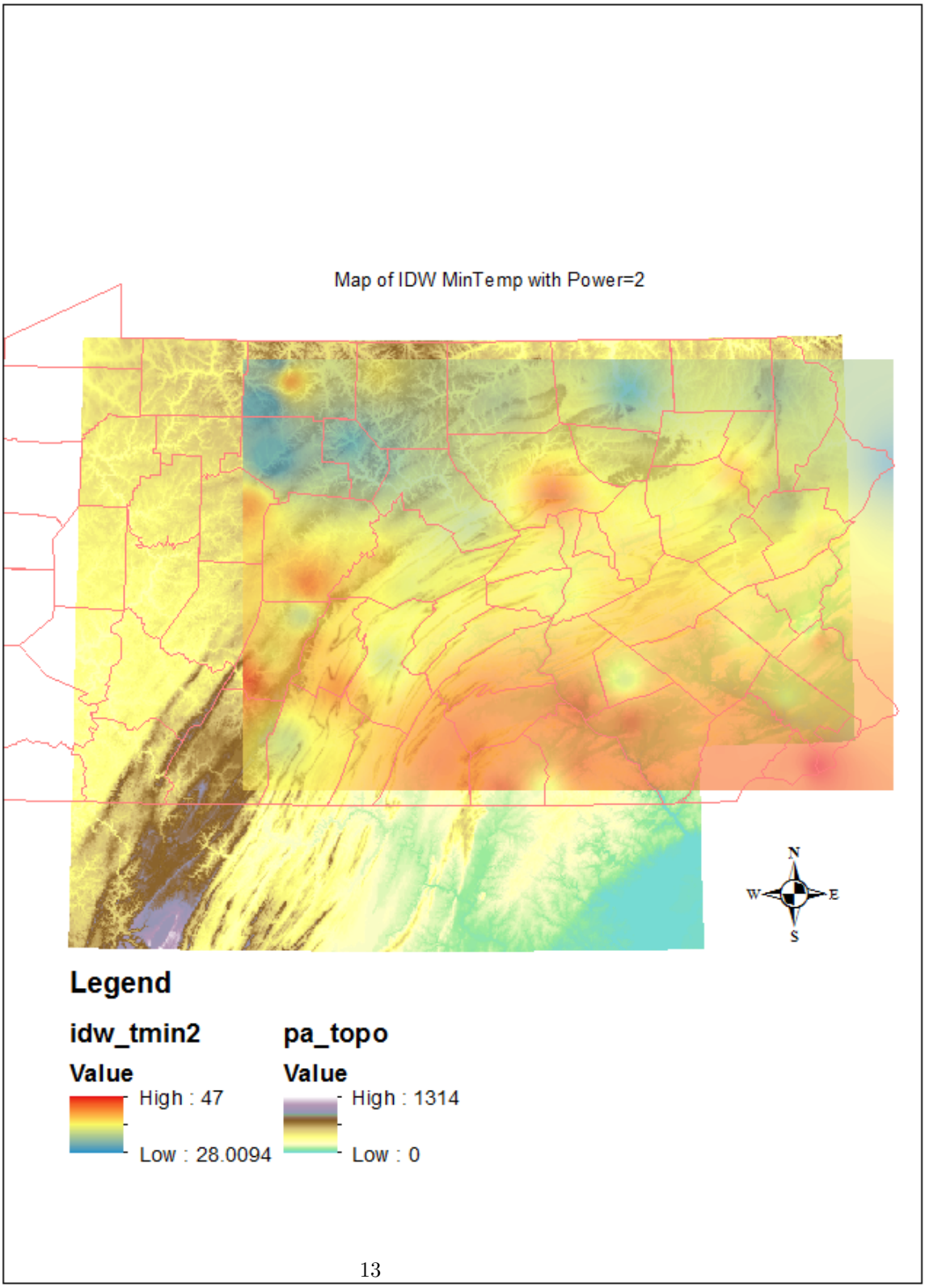

Map of IDW Precip with Power=4
N
W
E
S
Legend
int_pcp4
Value
High : 165
Low : 16
pa_topo
Value
High : 1314
Low : 0

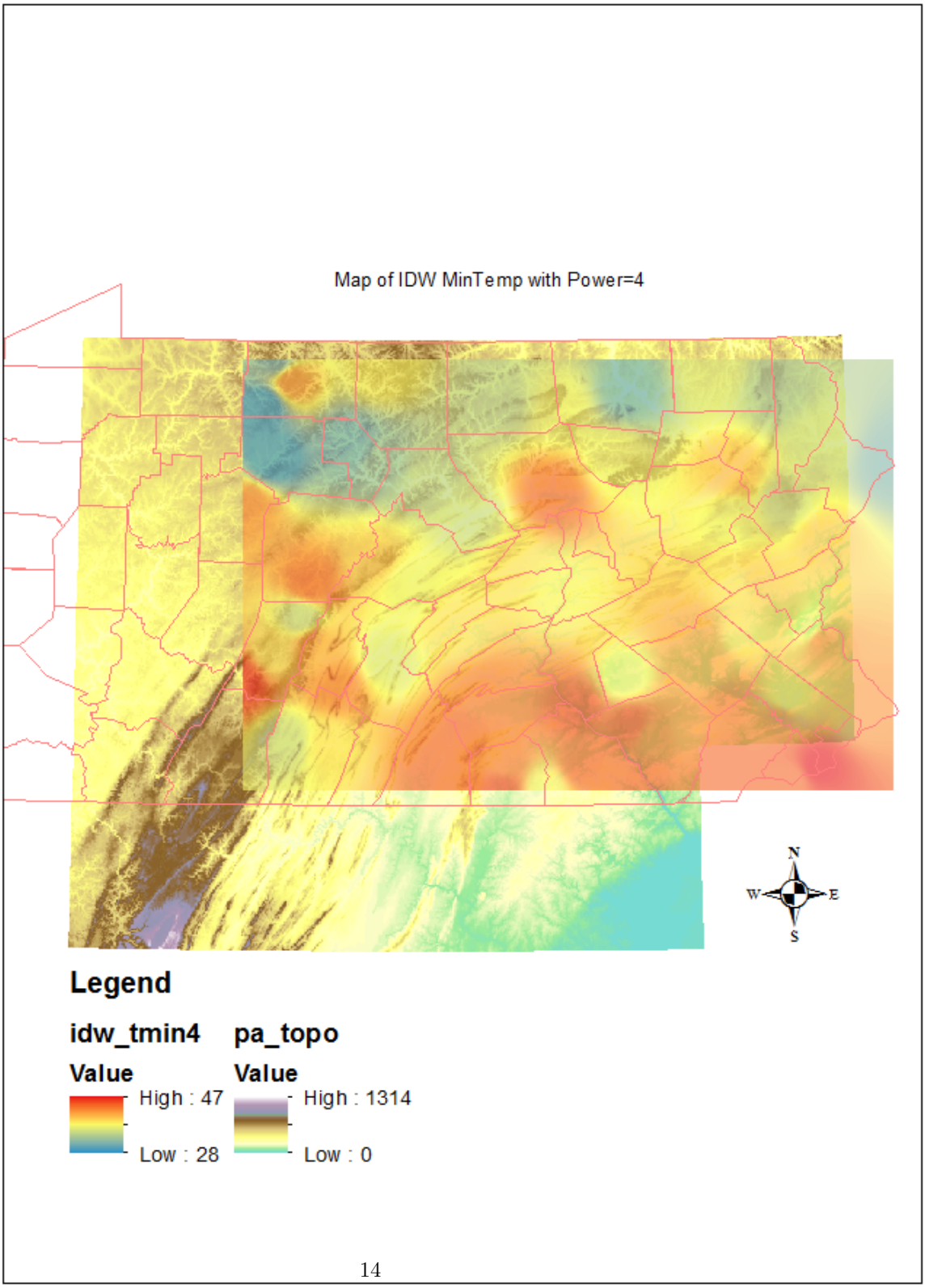

Map of IDW MaxTemp with Power=1
N
W
E
S
Legend
idw_tmax1
Value
High : 66.9195
Low : 45.9202
pa_topo
Value
High : 1314
Low : 0


Map of IDW MaxTemp with Power=2
N
W
E
S
Legend
idw_tmax2
Value
High : 66.9999
Low : 45.0099
pa_topo
Value
High : 1314
Low : 0


Map of IDW MaxTemp with Power=4
N
W
E
S
Legend
idw_tmax4
Value
High : 66.9977
Low : 45.0077
pa_topo
Value
High : 1314
Low : 0

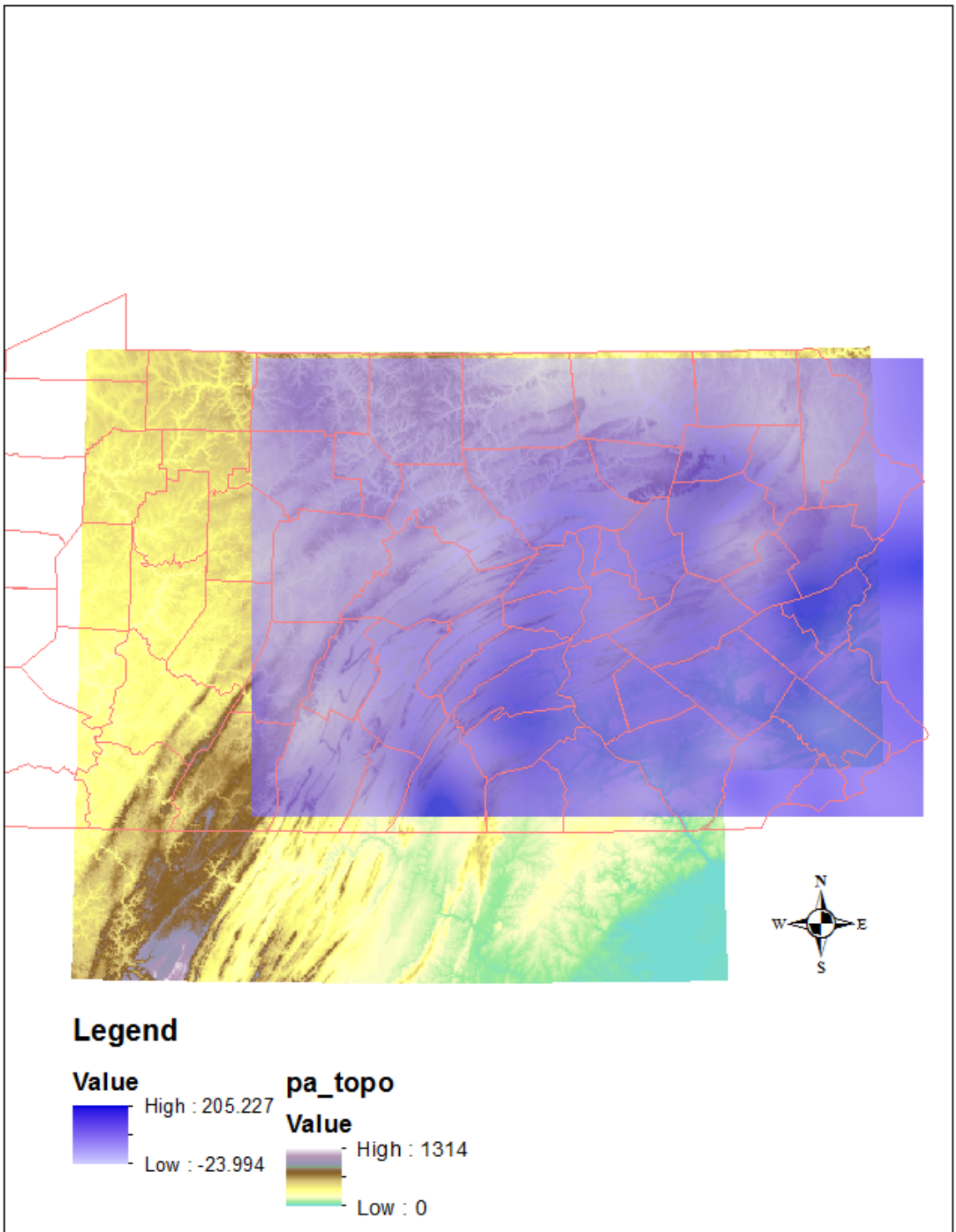

Map of IDW MinTemp with Power=1
N
W
E
S
Legend
idw_tmin1
Value
High : 46.8704
Low : 28.6944
pa_topo
Value
High : 1314
Low : 0

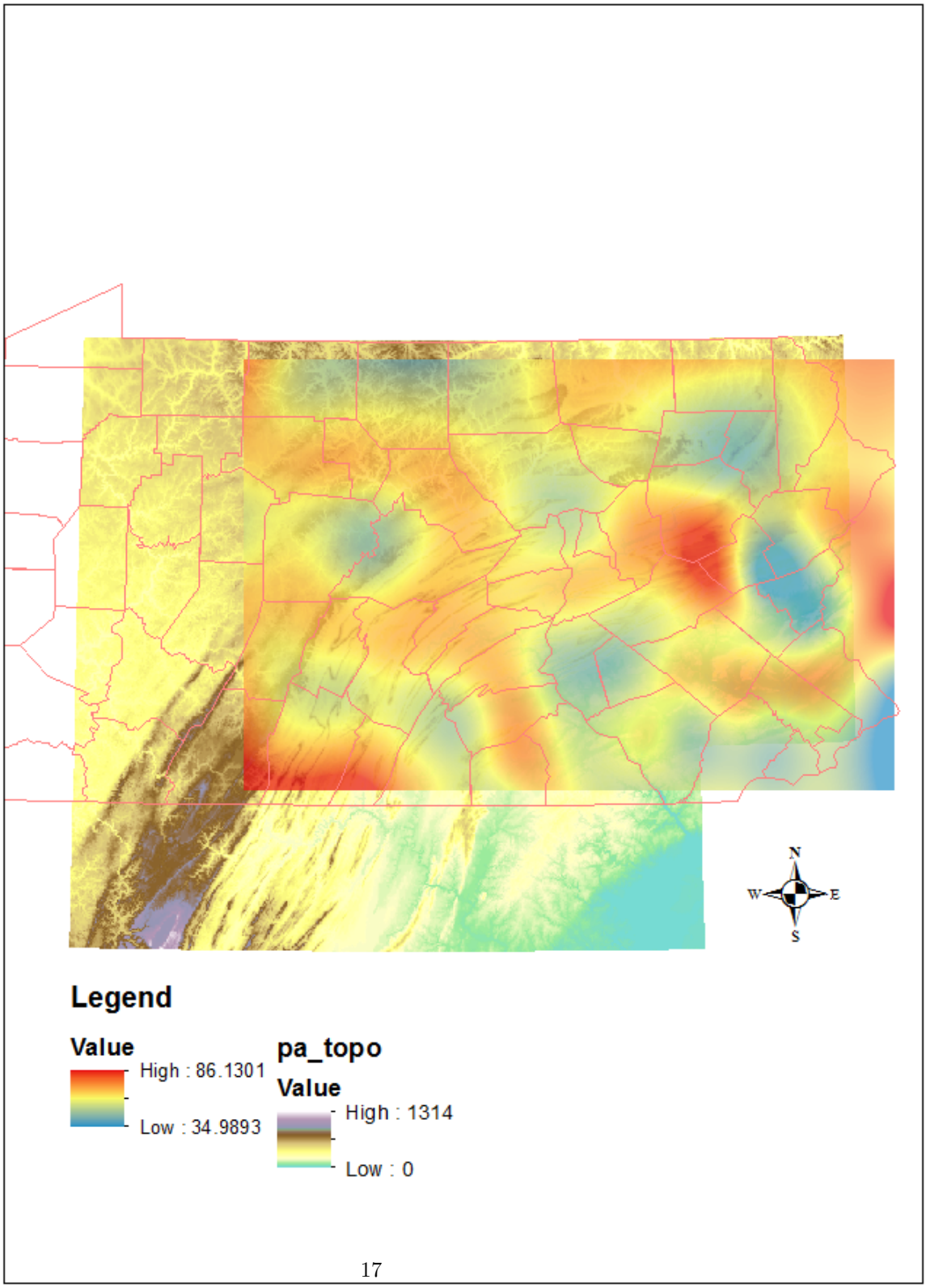

Map of IDW MinTemp with Power=2
N
W
E
S
Legend
idw_tmin2
Value
High : 47
Low : 28.0094
pa_topo
Value
High : 1314
Low : 0

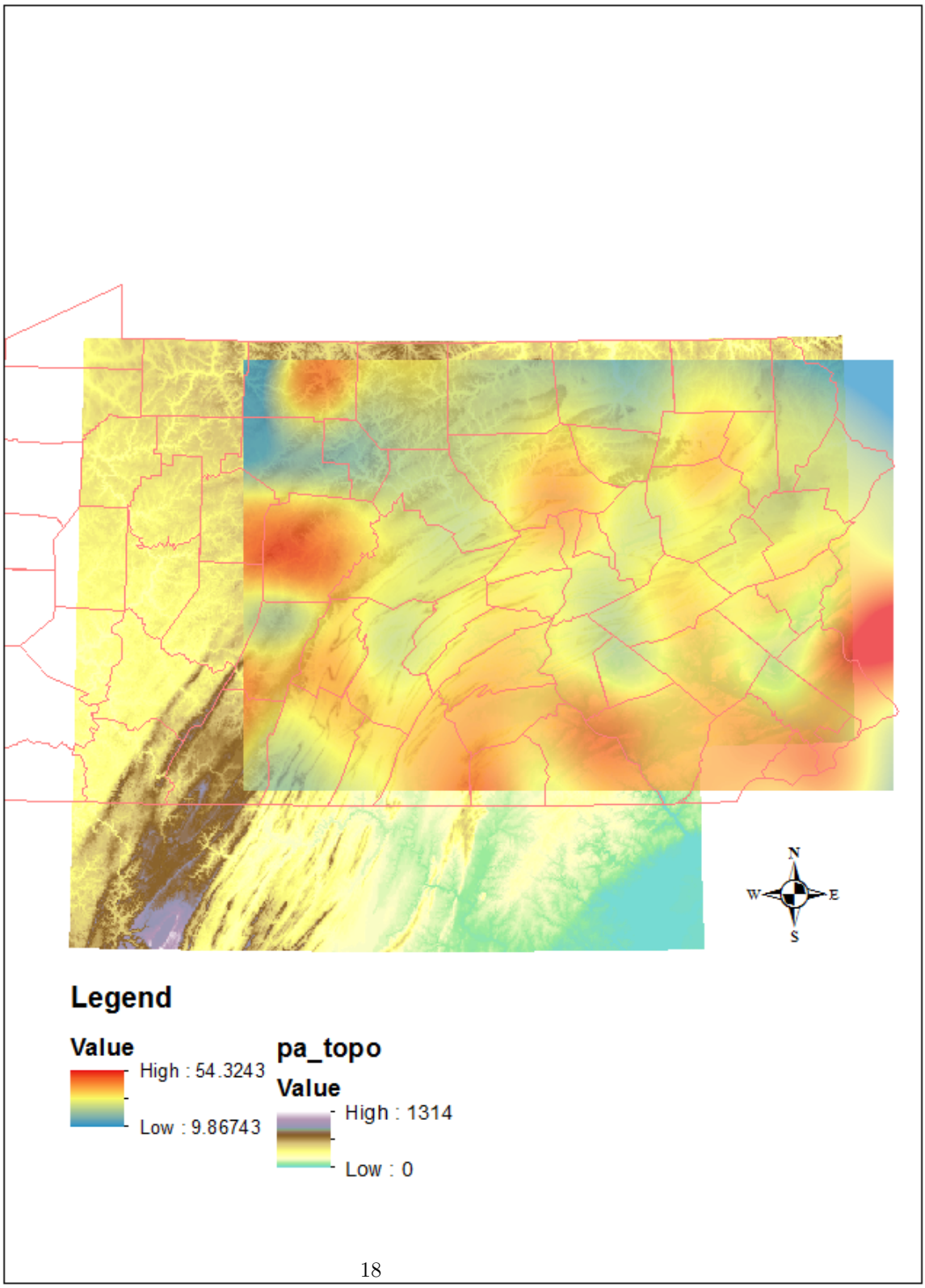

Map of IDW MinTemp with Power=4
N
W
E
S
Legend
idw_tmin4
Value
High : 47
Low : 28
pa_topo
Value
High : 1314
Low : 0

3 Assignment III: Spline Analysis

The spline interpolation did not appear to elucidate the trends in precipitation and temperature as well as inverse distance weighting with a small power. The interpolation appeared to be more patchy and locally fit (figs. 13-15).

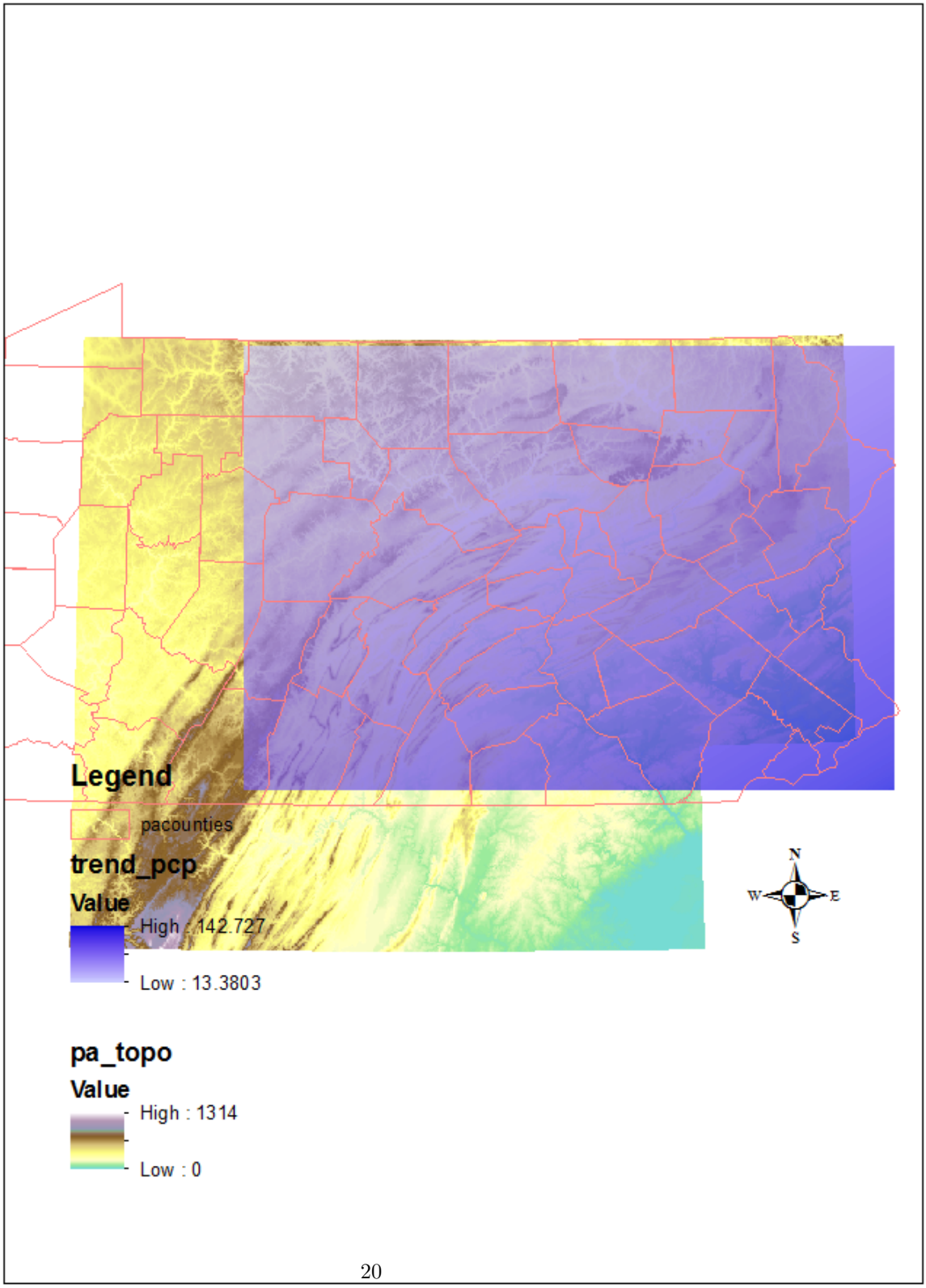

N
W
E
S
Legend
Value
High : 205.227
Low : -23.994
pa_topo
Value
High : 1314
Low : 0


N
W
E
S
Legend
Value
High : 86.1301
Low : 34.9893
pa_topo
Value
High : 1314
Low : 0


N
W
E
S
Legend
Value
High : 54.3243
Low : 9.86743
pa_topo
Value
High : 1314
Low : 0

4 Assigment IV: Trend Analysis

There does appear to be a trend in precipitation according to the trend analysis (figure 16). It appears as though there is more precipitation in the lowland areas than in the higher regions. Interestingly, this is the opposite trend one would expect from orographic weather.


Legend
pacounties
trend_pcp
Value
High : 142.727
Low : 13.3803
pa_topo
Value
High : 1314
Low : 0
N
W
E
S