Solid-phase geochemical survey of the State of Mississippi; an atlas depicting site data for stream sediment and soil sample locations

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Throughout the course of the geochemical survey (Mississippi I Data Set), a field sheet was completed for each sample location. These records contain pertinent information characterizing the site specific environment and characteristics, which is ultimately important in analysis and comparison of the geochemical data. The field sheets include information regarding geology, location coordinates, elevation, relief, vegetation, channel width, water depth, water color, water alkalinity, stream stage, stream flow rate, setting, and possible contaminants. This type of information can be easily distilled into a useful map representation through GIS capabilities. The following maps illustrate the distribution and distinguishing aspects of the field data collected at each geochemical sample location in Mississippi.

The geochemical survey conducted in Mississippi concentrated on two sample types; stream sediment and soil (Plate 1). Stream sediment was selected as the preferred sample media in order to obtain results which best represent the geochemical make-up of a particular watershed. Soil samples, which provide point specific data, were utilized in areas where suitable streams were not available for sampling. Soil samples were primarily collected in the "Delta" (Mississippi River Alluvial Plain) and along the Gulf Coast.

Plate 1

Sample Types

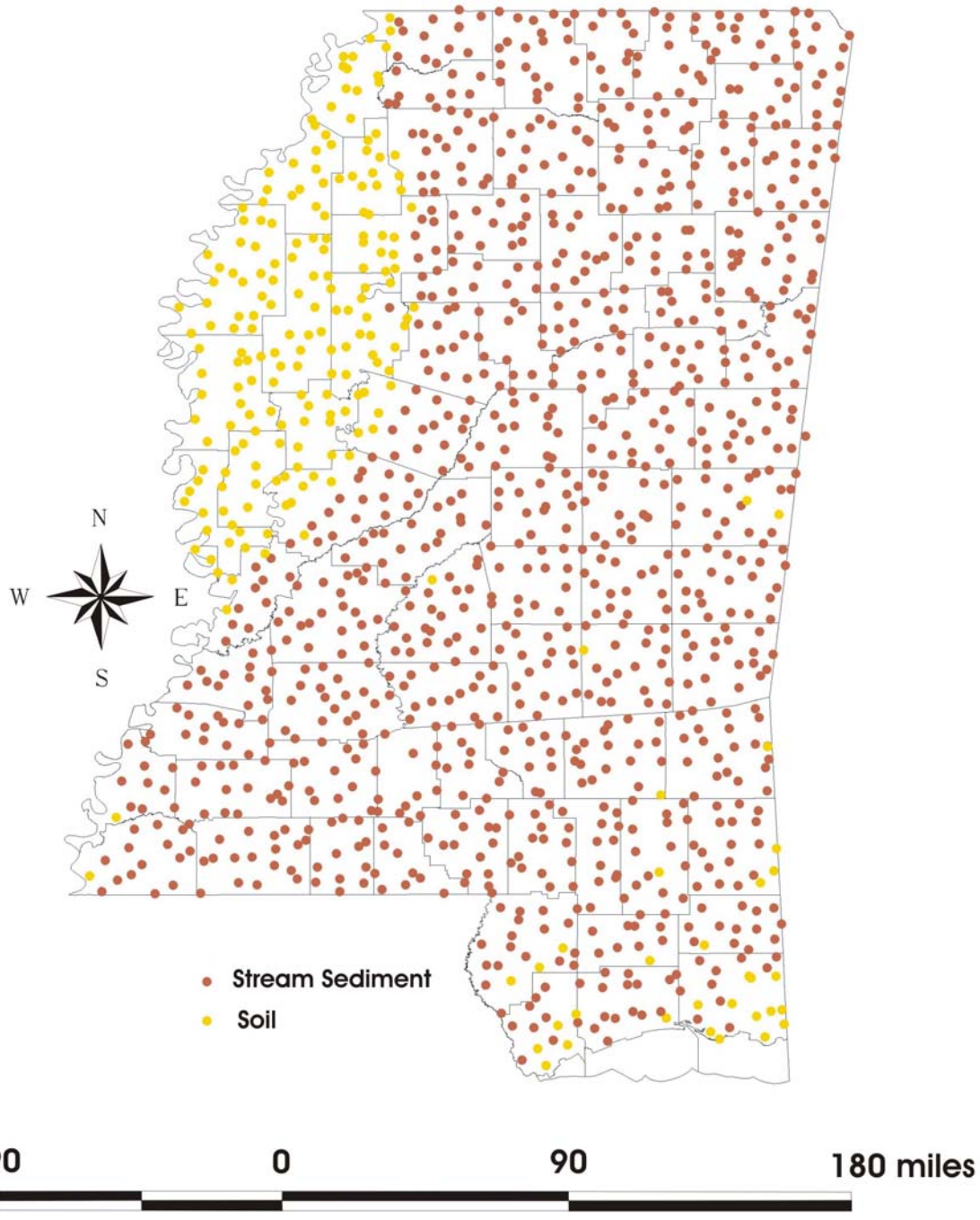
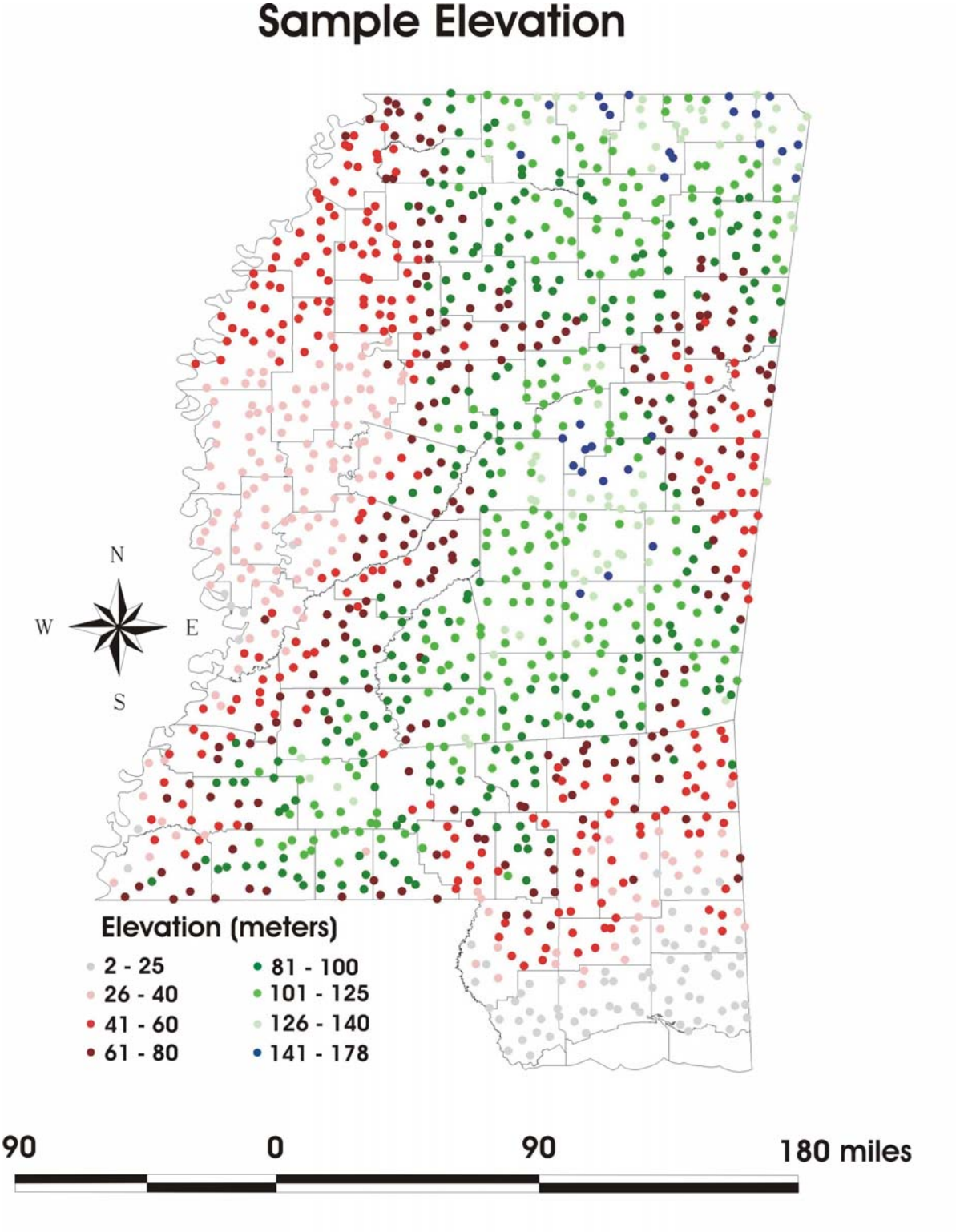


Plate 2 is a depiction of the elevation range (meters) associated with a particular sample grid location. Each sample grid comprises a 10 x 10 sq. km area. The resulting figure approximates the topography of Mississippi.

Plate 2



The following figure (Plate 3) portrays the range of relief associated with a particular sample grid location. The resulting figure is an approximate relief map of Mississippi.

Plate 3

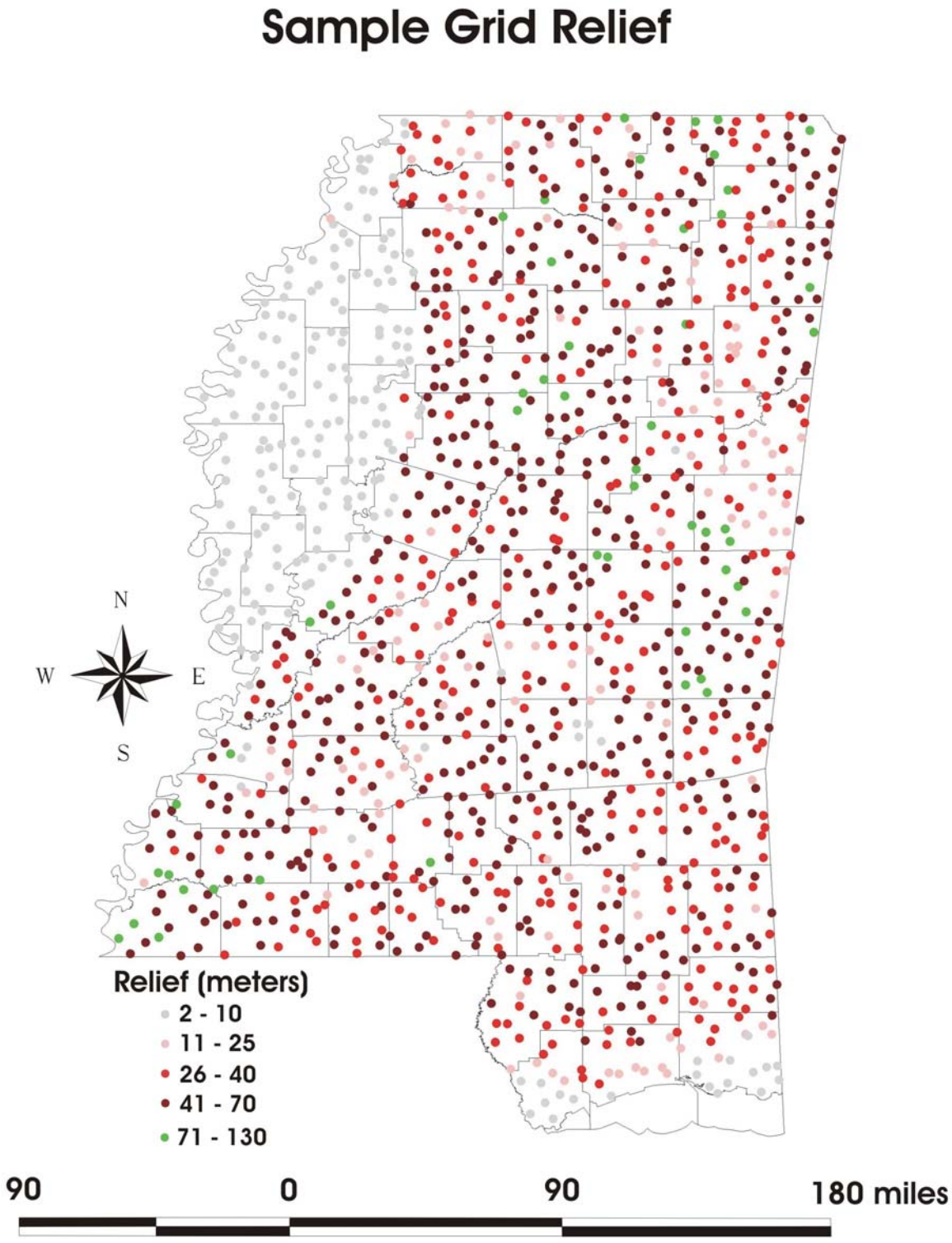
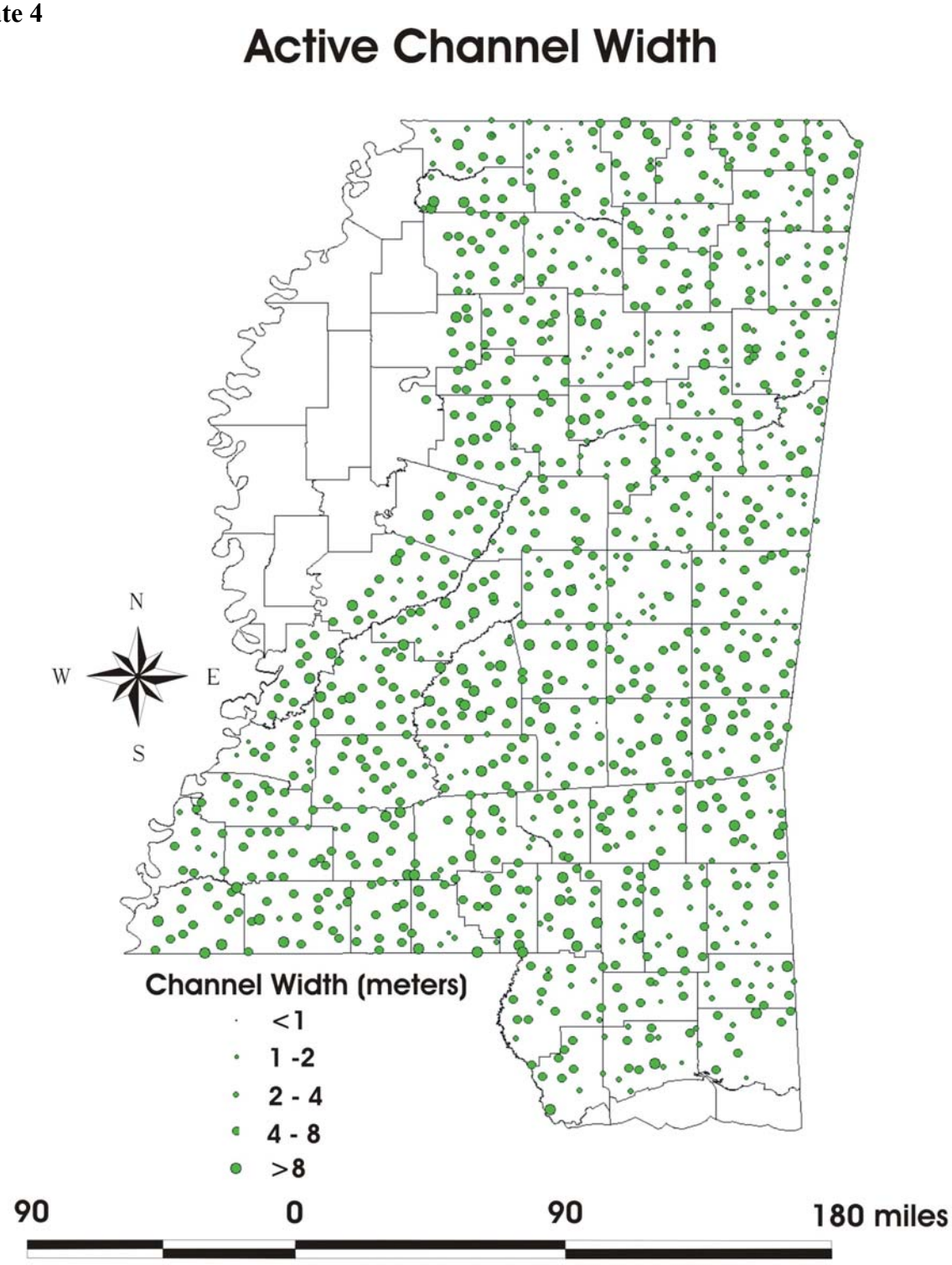


Plate 4 is a depiction of the active channel width (meters) of streams associated with a particular sample location. Soil sample locations are not depicted.

Plate 4



The following figure (Plate 5) portrays the flood plain width (meters) of streams associated with a particular sample location. Soil sample locations are not depicted. The vast majority of streams sampled had a flood plain width greater than 16 meters.

Plate 5

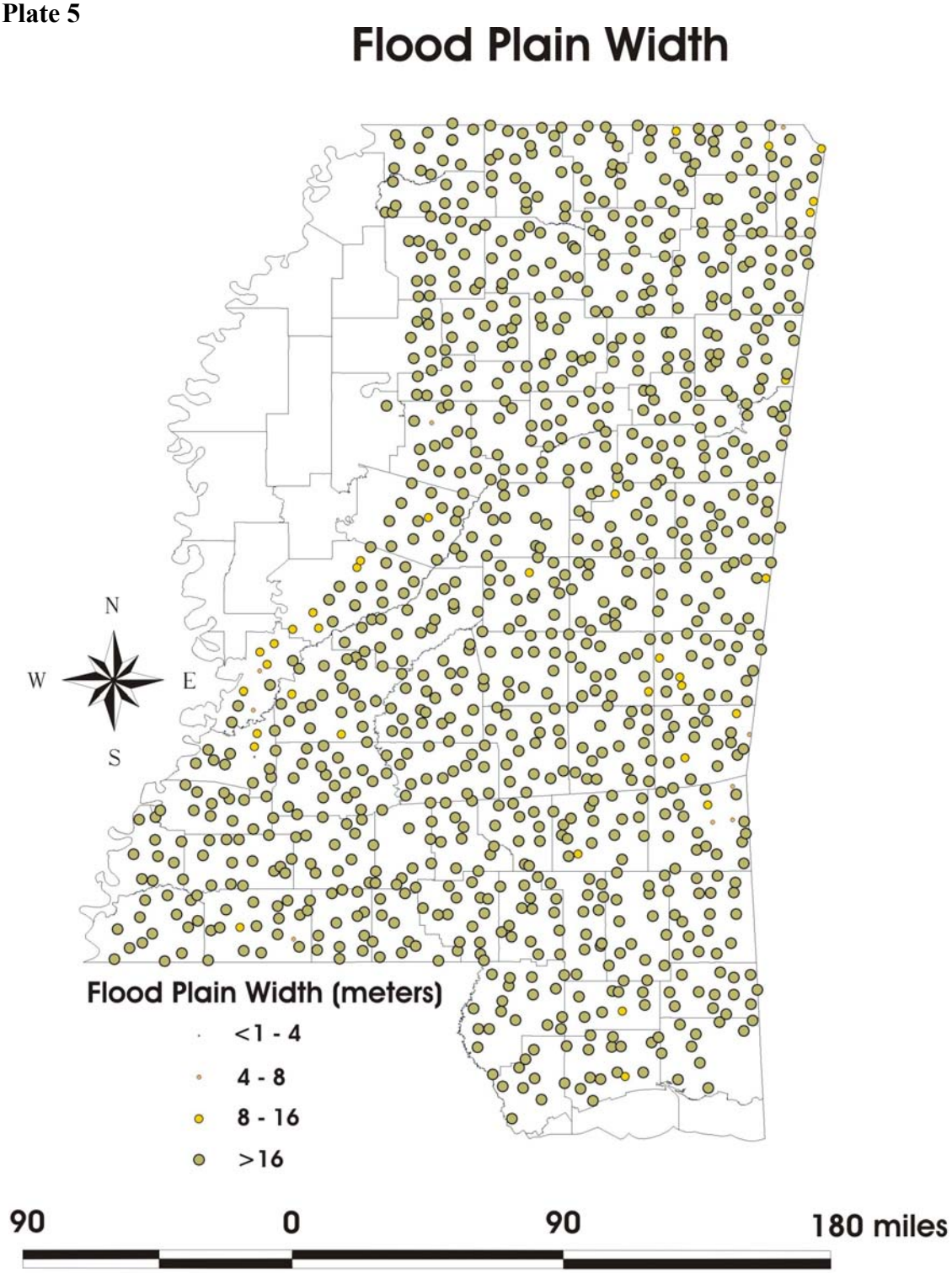
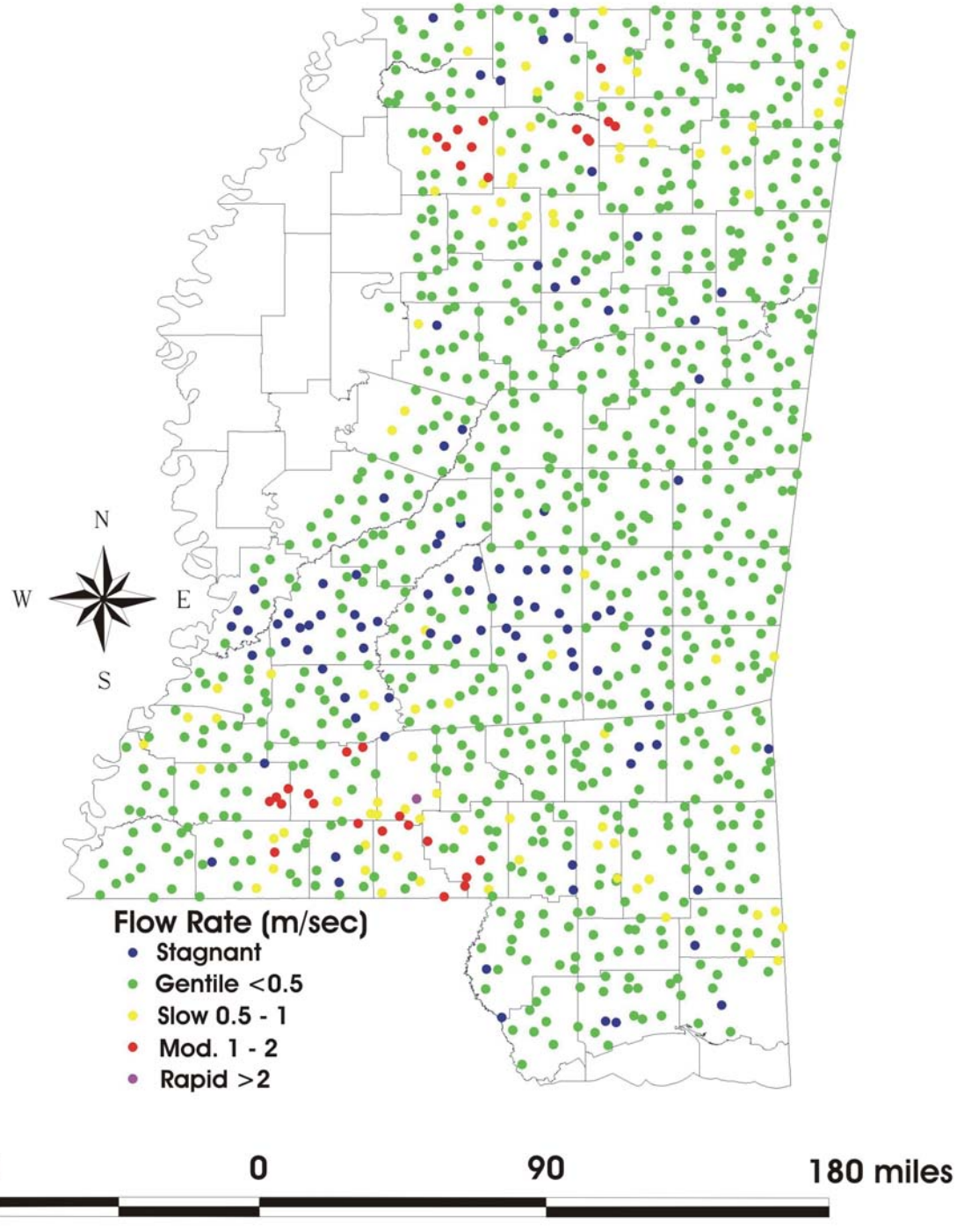


Plate 6 portrays the stream flow rate (meters/second) of streams associated with a particular sample location. Soil sample locations are not depicted. Stream flow rate information was largely dictated by the weather conditions at the time of sampling. Hence, map patterns with notably high or low flow rates are largely associated with closely spaced samples taken during the same period during very rainy or very dry weather.

Plate 6

Stream Flow Rate



The following figure (Plate 7) illustrates stream sediment locations where mollusk occurrences were observed. This information was collected as an indicator of the biological health of a stream. However, this information is far from comprehensive as streams were not fully investigated and some streams may have naturally unsuitable conditions for mollusk populations. Soil sample locations are not depicted.

Plate 7

Noted Mollusc Occurrences

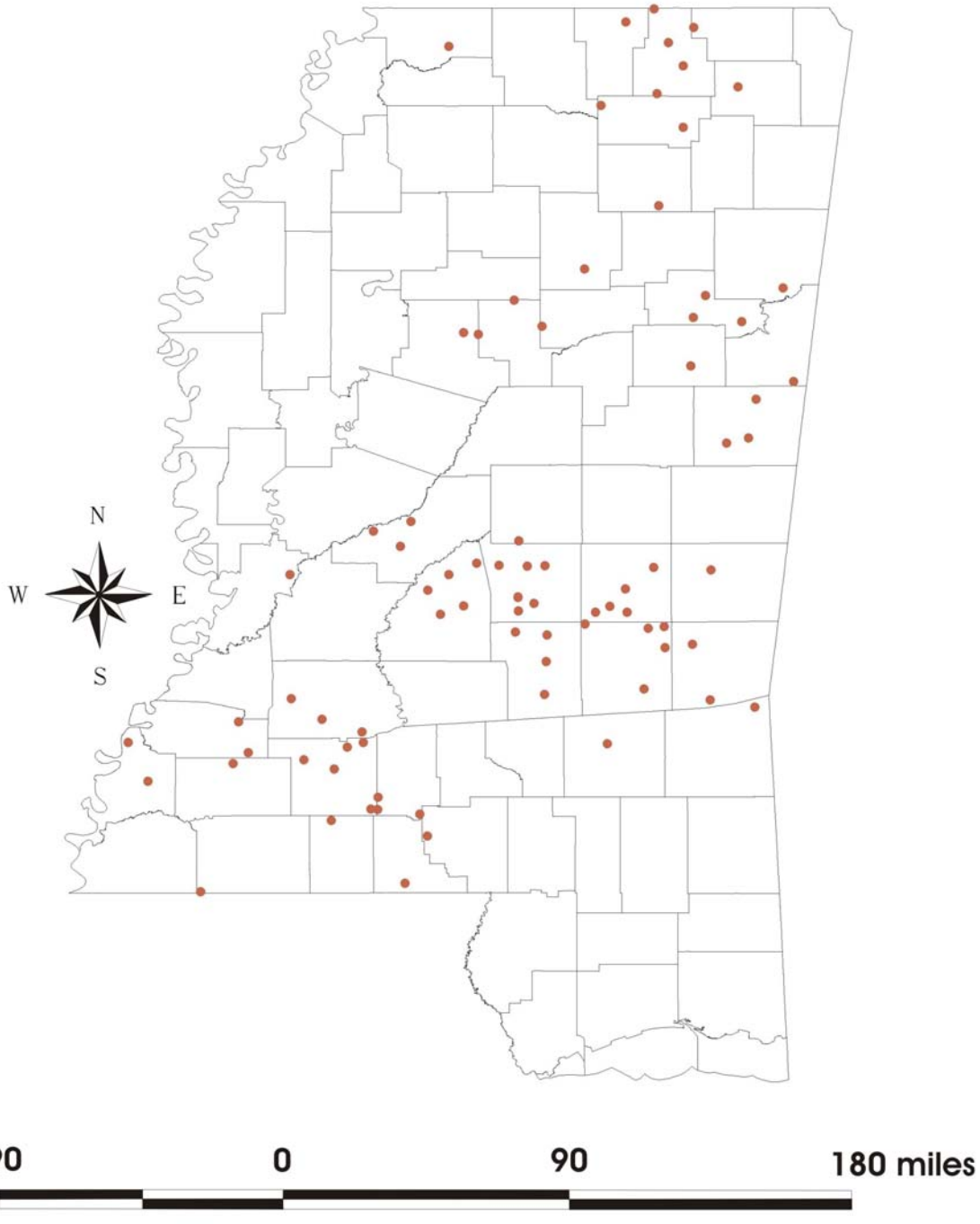
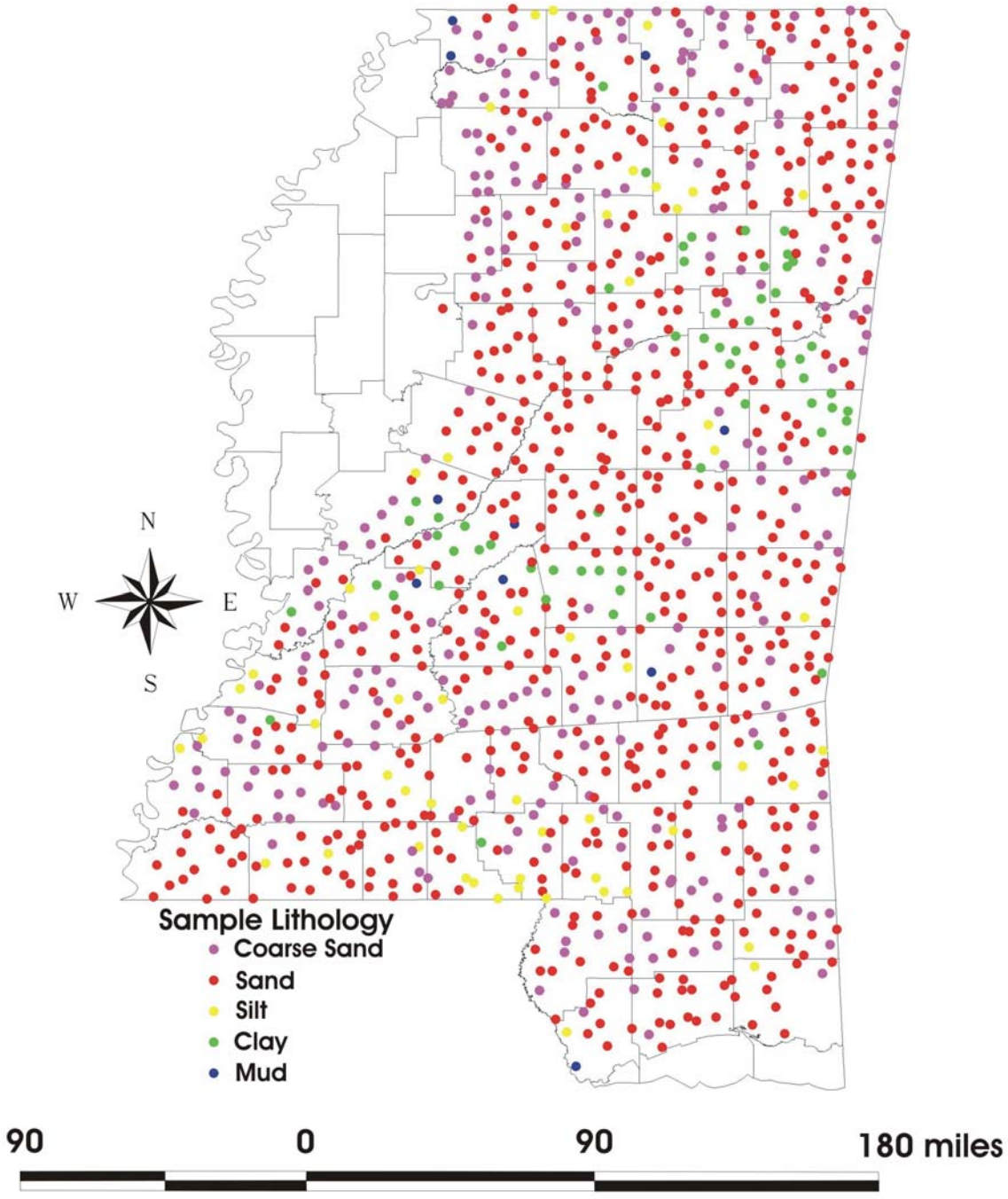


Plate 8 is a depiction of the stream sediment sample lithology collected from streams associated with a particular sample location. Soil sample locations are not depicted. A large number of the samples were sand and coarse-grained sand. The resultant map is basically a rough lithologic map of the state, related specifically to the alluvial geology.

Plate 8

Stream Sediment Sample Lithology



The following figure (Plate 9) portrays the environmental/land use setting of streams associated with a particular sample location. A few soil sample locations, particularly in the extreme northwestern part of the state, are inadvertently shown. This is due to error of the sample technician. The setting designation is correct, however, the intent of the classification was to include only stream sediment locations.

Plate 9

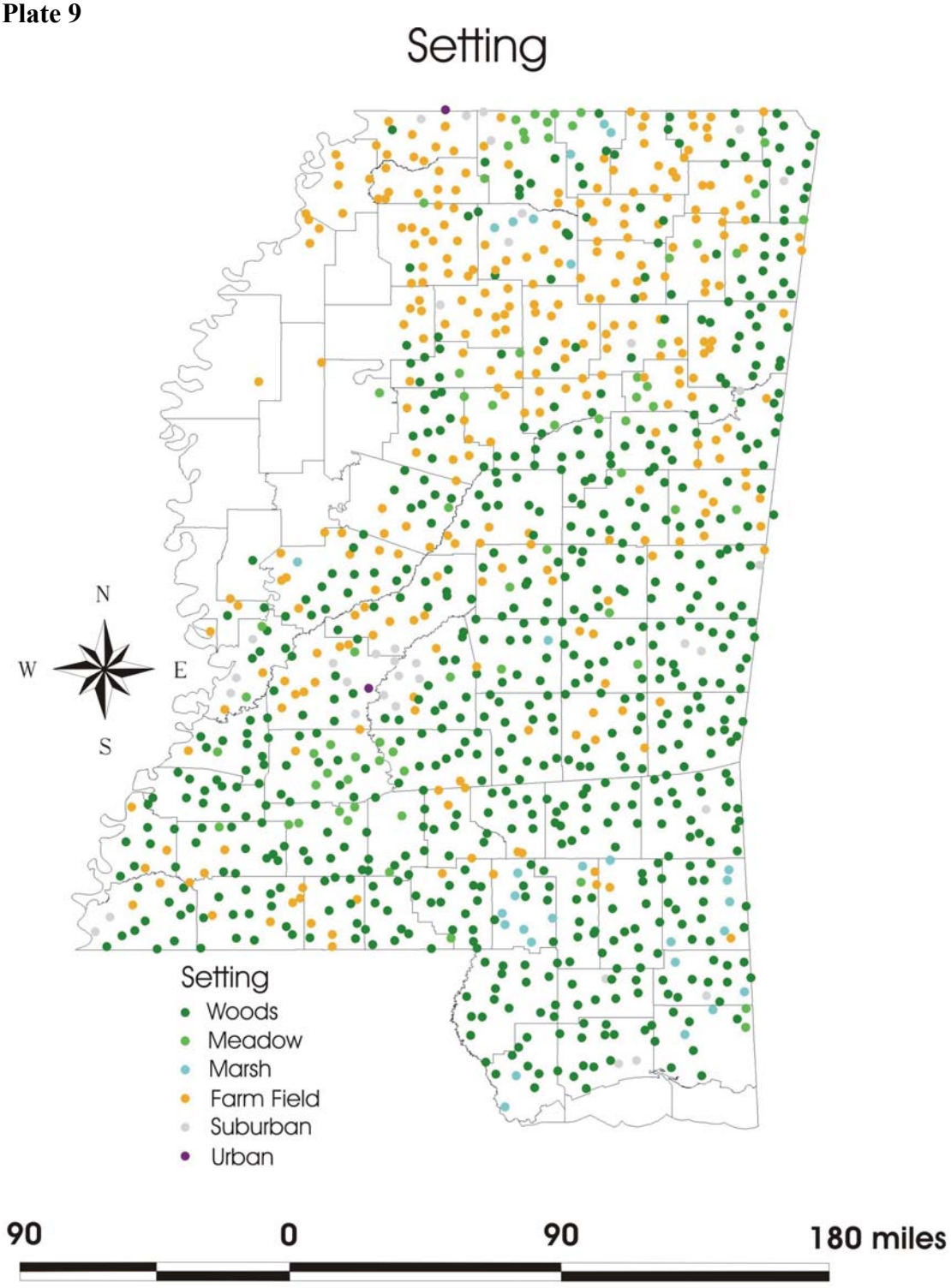
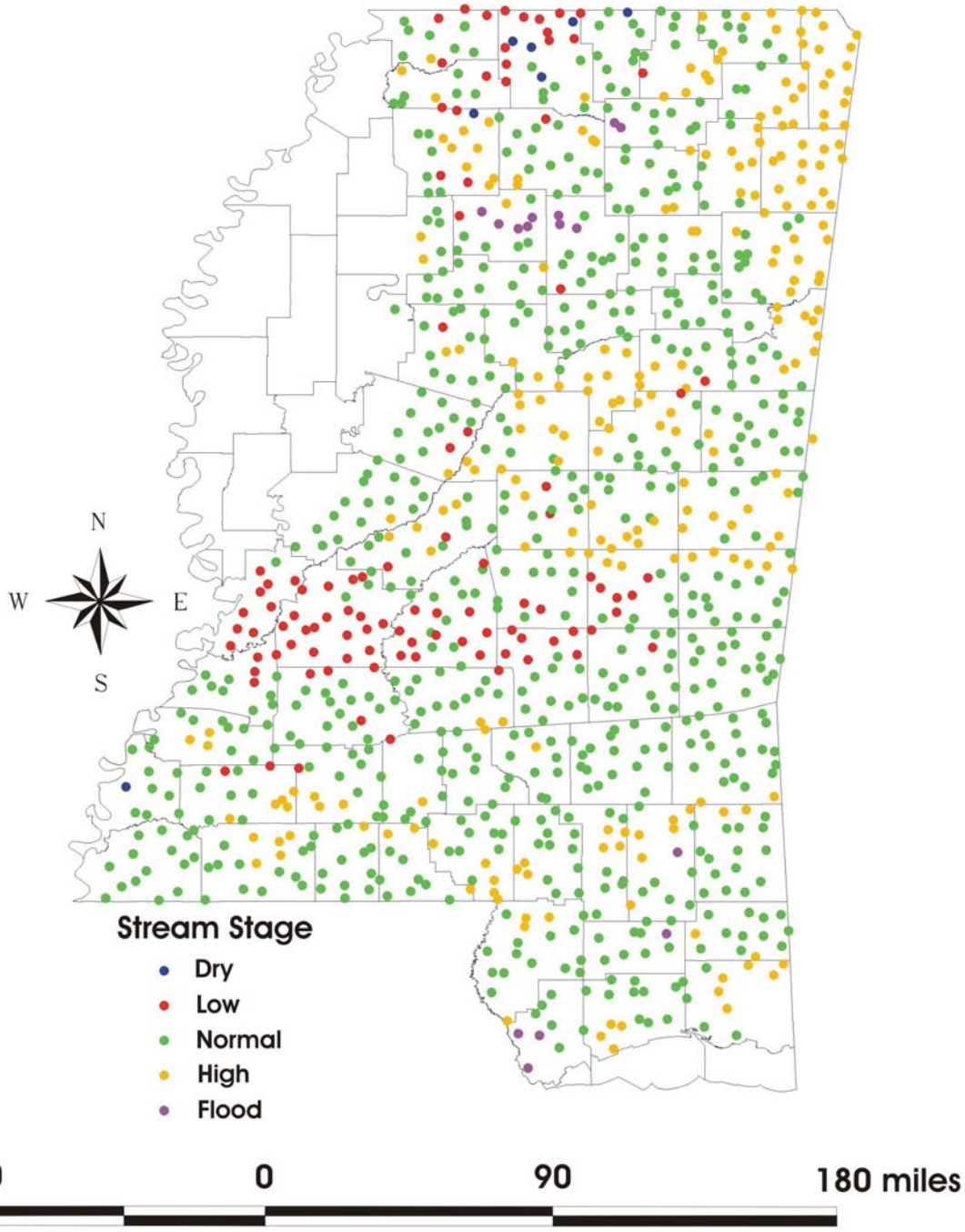

Setting
N
W
E
S
Setting
Woods
Meadow
Marsh
Farm Field
Suburban
Urban
90
0
90
180 miles

Plate 10 is a portrayal of the stream stage associated with a particular sediment sample location. A large number of the samples were sand and coarse-grained sand. Soil sample locations are not depicted. As was the case with the flow rate information, the stream stage was largely dictated by the weather conditions at the time of sampling. Hence, map patterns with notably high or low stream stages are largely associated with closely spaced samples taken during the same period during very rainy or very dry weather.

Plate 10

Stream Stage



The following figure (Plate 11) portrays the bed lithology of streams associated with a particular sample location. Soil samplelocations are not depicted. The stream bed lithology may differ markedly from the sample lithology. For example, a creek lined with a clay sub-stratum may contain overlying sediment predominantly composed of sand or silt (the sampled media). This resultant map is basically a rough lithologic map of the state, related specifically to the pre-alluvial geology.

Plate 11

Stream Bed Lithology

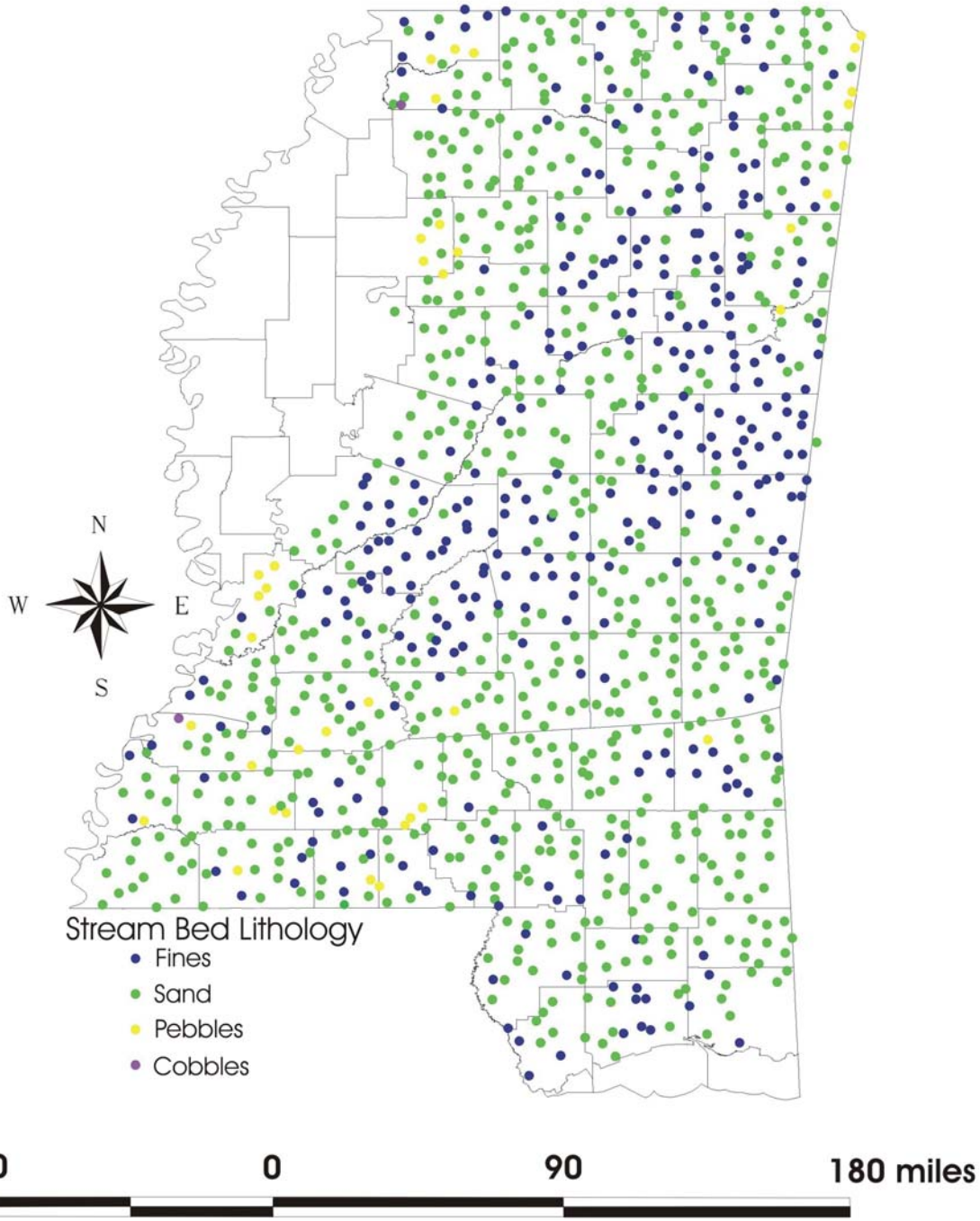
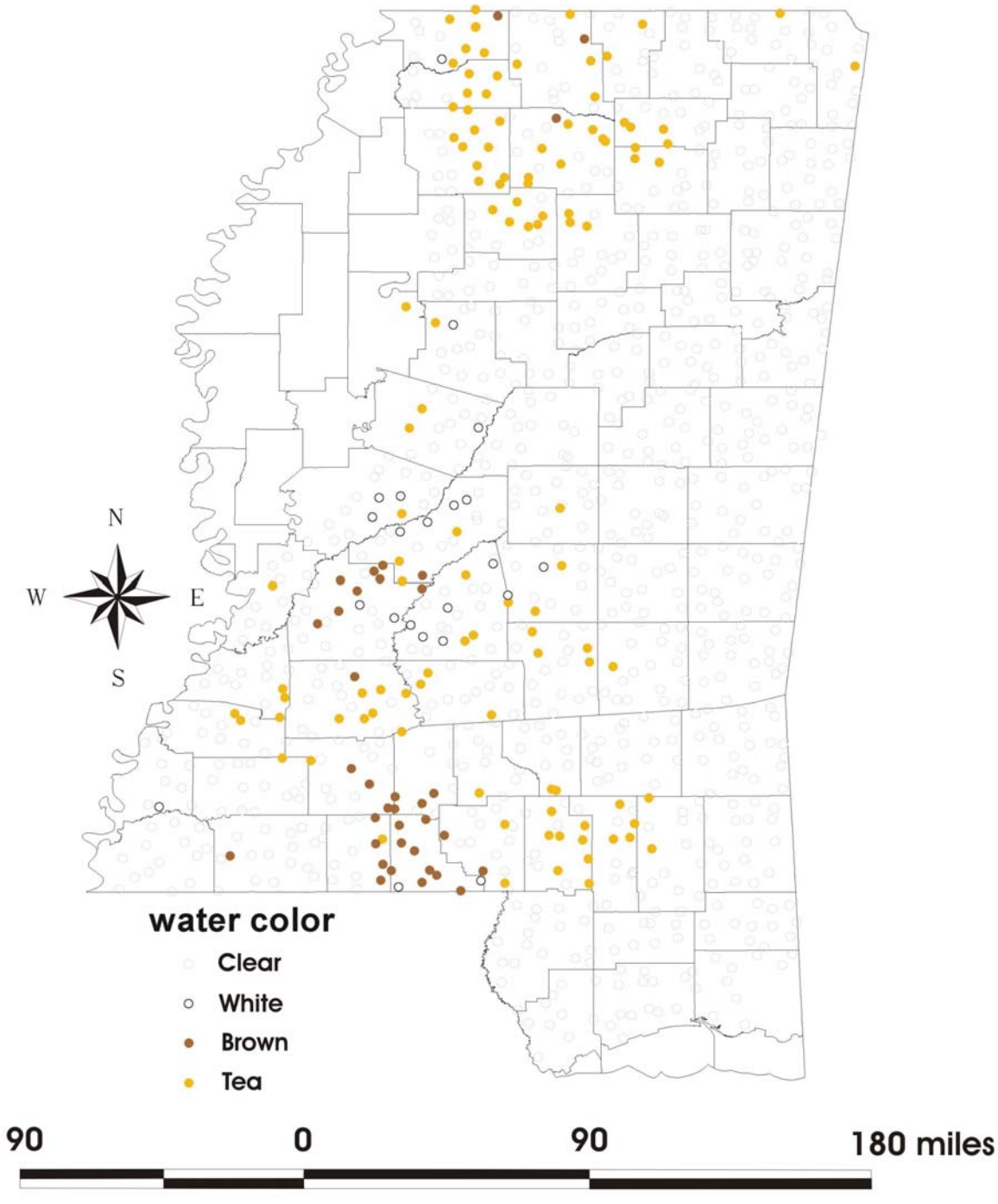


Plate 12 is a representation of the water color associated with a particular stream sediment sample location. Soil sample locations are not depicted. There are apparent errors with this collected data. The instructions involved observation of the water color from the sample scoop or a glass. The vast majority of samples viewed showed clear water. The creek bed color, in addition to reflected light from the sky, typically tints stream water color when viewed from the bank. It seems that due to sample technician error, some of the water color designations were likely garnered from a stream side observation.

Plate 12

Water Color



The following figure (Plate 13) depicts the water depth of streams associated with a particular sample location. Soil sample locations are not depicted.

Plate 13

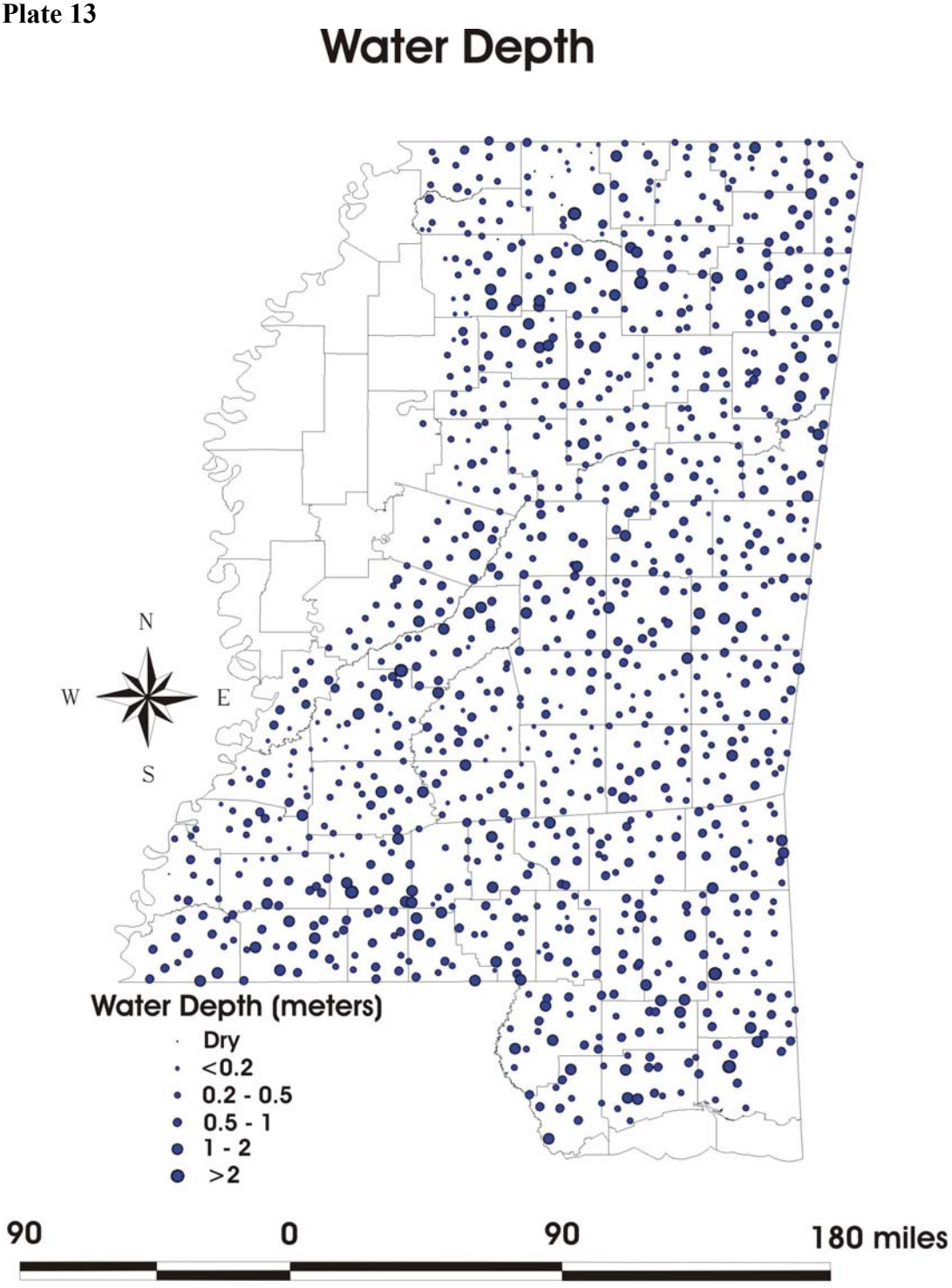
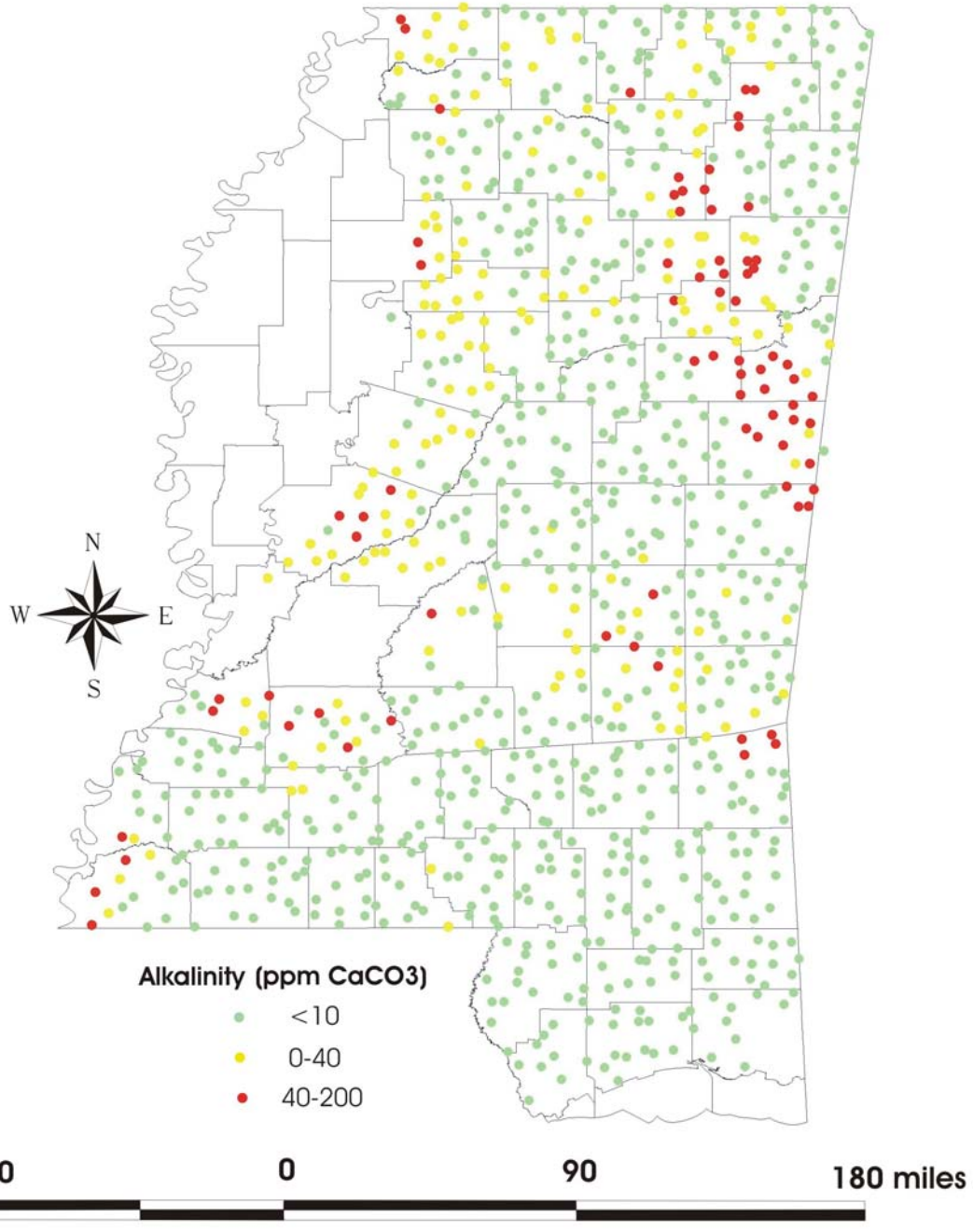


Plate 14 is a representation of the stream alkalinity associated with a particular stream sediment sample location, expressed in parts per million of calcium carbonate. Soil sample locations are not depicted. The highest levels of calcium carbonate (yellow and red) highlight areas where limestone and calcareous clay exist (Cretaceous belt, Vicksburg Group). Another area where alkalinity was high due to calcium carbonate was in the Loess Bluff Hills bordering "The Delta". The thicker beds of relatively unweathered Loess are known to be calcareous. The high alkalinity levels found in Simpson County are anomalous and perhaps represent error. Notably, there is a gap of alkalinity data in Warren, Hinds, and Rankin counties. This is because the titration kits were delivered late; those areas were sampled first, prior to the arrival of the supplies.

Plate 14

Stream Alkalinity



Acknowledgements
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Resources

Thompson, D. E., A. E. Grosz, J. M. McNeal and J. N. Grossman, 1998, Surface geochemistry of Mississippi to be surveyed: Mississippi Geology v. 19, no. 2, p. 13-19.

Thompson D. E., A. E. Grosz, P. G. Schruben and J. N. Grossman, 2002, Solid-phase geochemical survey of the State of Mississippi; on the nature and distribution of As, Se, Hg, Cu, Pb, and Zn in stream sediments and soils [abs.]: Journal of the Mississippi Academy of Sciences, v. 47, no. 1, p. 42.