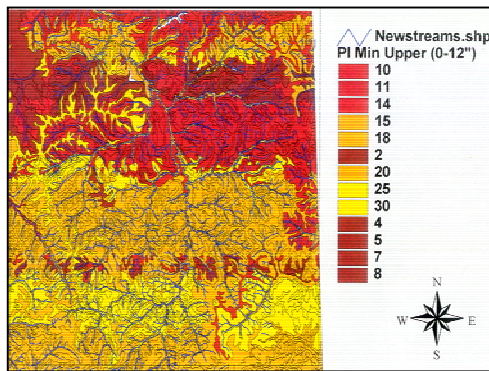


Stevens Creek Watershed Plan

Lincoln, Nebraska

Quantitative information on stream behavior is critical for any watershed plan; however, it can be expensive to obtain. The challenge was to significantly improve the cost effectiveness of geomorphic data collection while supporting reliable planning decisions. Stevens Creek flows for 53 miles through largely agricultural land facing imminent development. The City of Lincoln and the Lower Platte South Natural Resource District desire a plan to protect the incoming development from flooding and erosion hazards while also protecting the natural resources. The commissioned master plan includes a geomorphic analysis as well as a hydrologic and hydraulic model and extensive public participation.



When the cost of collecting and processing large data sets becomes problematic there are two choices; gather less information and rely on qualitative assessments or maintain the integrity of the data and increase the efficiency of collection and processing. We choose the latter. Recent advances in GIS, GPS, remote sensing and field-rugged computers enable rigorous, quantitative analyses at a manageable cost. Using the City's GIS layers of aerial photographs,

topography and soil types, we performed the classical drainage network, plan form and profile analyses of the stream. We correlated anomalies in meander geometry or profile slope with soil properties. All field data is also collected directly onto a series of GIS layers enabling real time analysis and presentation.

The geomorphic analysis enables generation of an erosion hazards map analogous to a flood map. From the geomorphic analysis of stream shape and material strength, we can determine resistance of the stream to channel adjustment associated with changes in land use. By comparing the future-condition hydraulic stresses against the channel strength, we can infer the likely locations, extent and mechanism of channel migration. This provides a defensible basis for planning decisions such as riparian buffer zones, required stormwater controls and stream protection strategies.

