

In 2022, the National Geodetic Survey (NGS) will update the entire National Spatial Reference System (NSRS). NGS will no longer maintain the NAD83 coordinate system as the basis for all coordinates in the United States. By utilizing modern technologies, the NGS will develop the State Plane Coordinate System of 2022 (SPCS2022) to better facilitate advancing technologies.

The NGS has allowed for a multi zone, layered approach to minimize distortion at the topographical level. The approach consists of one zone for the entire state that would potentially be used for general mapping applications. The second is considered a Low Distortion Projection (LDP) zone, which is a localized coordinate system to better represent state plane coordinates at the topographical surface.

In 2018 the North Dakota Society of Professional Land Surveyors appointed a committee consisting of members from both the public and private sector to study the options related to the approach of coordinate creation for the entire state. During this process, the committee reviewed several other states that had already created and adopted LDP zones for use in the geospatial community before the NGS suggested the approach. Several factors were discussed regarding the obstacles of creation and ultimate implementation of the data.

The North Dakota Department of Transportation (NDDOT) relies on the NGS as the basis of compiling data related to all state and federal highway projects. After reviewing recommendations from the committee and adhering to department policy and mission statements, the NDDOT advertised a Request for Proposal (RFP) for the creation of multi-zone LDP coordinate system in February 2019.

The RFP stated that the zones need to cover the entire state, follow county boundaries and will need to be designed so the accuracy of the resulting coordinates will be within +/-20 ppm (1:50,000) with a slightly greater distortion allowable in small areas of some zones. The number of zones will be minimized while achieving the design distortion criterion.

In order to examine the benefits of an LDP zone, it was first paramount to study what is used in the state to bring grid coordinates to the ground surface. Currently, the NDDOT uses the NAD83 datum in two zones (North and South) and projects the state plane coordinate to a county ground coordinate by utilizing a combination factor created for each county. The current system results in 66% of the state falling into the +/-20ppm category, with 53 zones. This system was created with minimal GPS observations to evaluate in each county zone as it was an emerging technology.

Now, by evaluating and implementing years of GPS observations, it is possible to get a better understanding of how multiple factors affect overall distortion throughout a state plane zone system. Following the RFP criteria with zone boundaries on county lines, minimizing the number of zones, a system was created resulting in 95% of the state falling into the +/-20ppm category with 15 zones.

The current documents are in draft stage but do lay out several options and provide an overall visual aid on what to expect.