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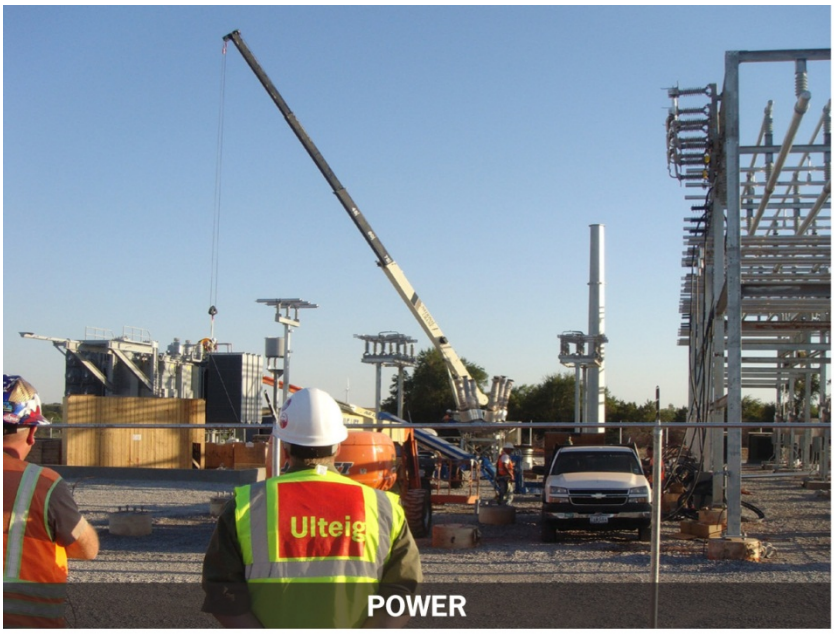
Greatest Needs Analysis – Ambulance Station

North Dakota Association Oil and Gas Producing Counties

Engineering, Surveying, and Consulting Services



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Engineering, Surveying, and Consulting Services

July 30, 2013
Vicky Steiner – Executive Director
NDAOGPC
400 East Broadway Ave.
Suite 304
Bismarck, ND 58501

Subject: Greatest Need Analysis – Ambulance 12.02149

Dear Ms. Steiner

Thank you for the opportunity to once again work for the ND Association of Oil and Gas Producing Counties. Please find our enclosed report analyzing the location of greatest need in the NDAOGPC 19 counties for additional ambulance service.

Please do not hesitate to contact us if you have any questions or need additional information.

Sincerely,

Mike Schnetzer
Senior GIS Analyst
701.355.2358
mike.schnetzer@ulteig.com

Mike Zimney
Lead GIS Analyst
701.280.8684
mike.zimney@ulteig.com

Background

Ulteig previously completed a study for NDAOGPC analyzing the existing ambulance coverage areas for 58 ambulance stations located in the 19 oil and gas producing counties (Figure 2). This Greatest Need Analysis project builds upon the previous work by investigating which areas currently not served within the 14.7 drive-time have the greatest need for an ambulance service. Several factors influencing the need for an additional ambulance station were identified: existing coverage area, population, DOT crash locations, ambulance runs, and proximity to existing cities. These factors of influence were imported into geographic information system (GIS) and analyzed to compare their relationship and find areas with the highest suitability.

Analysis

GIS was used to analyze the factors of influence to calculate which areas had the highest suitability for an ambulance service using Weighted Overlay Analysis. Weighted Overlay Analysis allows multiple layers of data to be compared to identify commonalities between different factors to show the highest and lowest suitability (Figure 1).

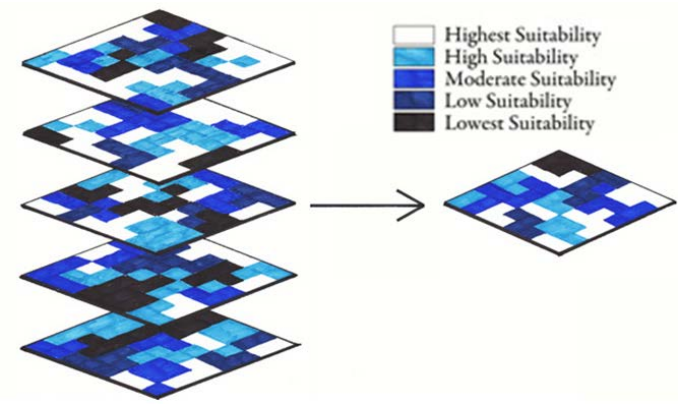

Figure 1 – Example of Weighted Overlay Analysis

The following factors of influence were imported into the GIS model:

1. Study Area: The study was limited to the 19 oil and gas producing counties and excluded areas within the existing 14.7 minute ambulance coverage area and bodies of water (Figure 2).
2. Population (Weighted Average 30%): 2012 census block group estimates for the study area were classified into three classes for the analysis based on total population using natural breaks clustering: top third total population group (high suitability), middle third total population group (neutral), and bottom third total population group (low suitability) (Figure 3).
3. Proximity to Cities (Weighted Average 10%): Priority was also given areas closer to any city currently without an ambulance station. This data was used to supplement the block group census data which often times has a large geographic area and proximity to cities allows the model to target where populations are more concentrated. Locations within three miles of a city (high suitability), location within seven miles (neutral), greater than seven miles (low suitability) were modeled (Figure 4).

4. DOT Crash Locations(Weighted Average 30%): 2012 crash locations were analyzed using a “hot spot” analysis tool to locate areas having high occurrences of crashes: clusters of high frequency crash points (high suitability), statistically insignificant clusters (neutral), and clusters of low frequency crash points (low suitability) (Figure 5).
5. Ambulance Runs (Weighted Average 30%): 2012 Department of Health Emergency Preparedness Division counts of total ambulance runs per station were classified into three classes for the analysis based on total runs using natural breaks clustering: top third total ambulance runs (high suitability), middle third ambulance runs (neutral), and bottom third ambulance runs (low suitability) (Figure 6). Western parts of McKenzie County and the southeast corner of Adams County are served by stations located in Montana and South Dakota, respectively and as such ambulance runs were not available.

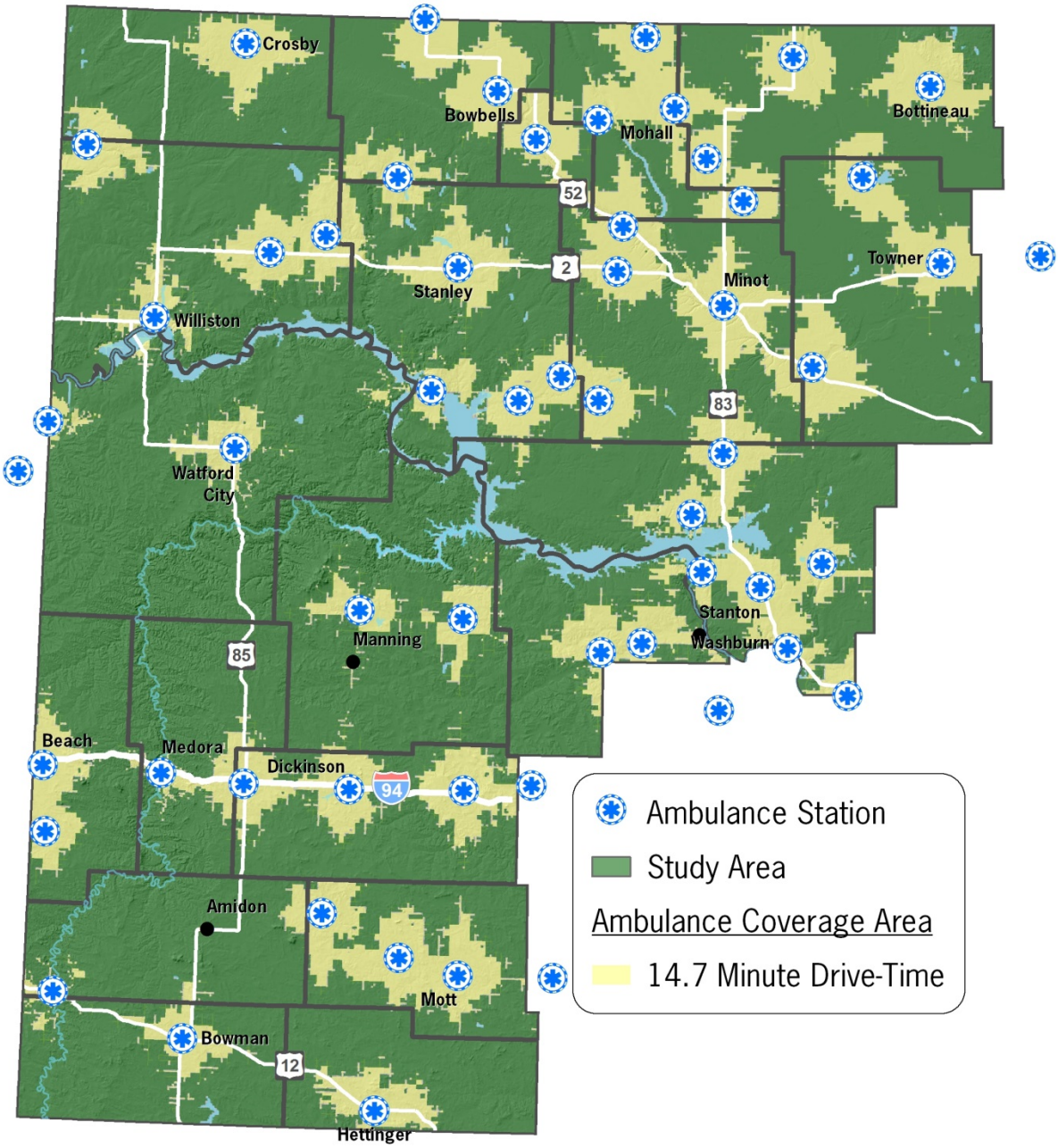

Figure 2 – Greatest Need Analysis Study Area

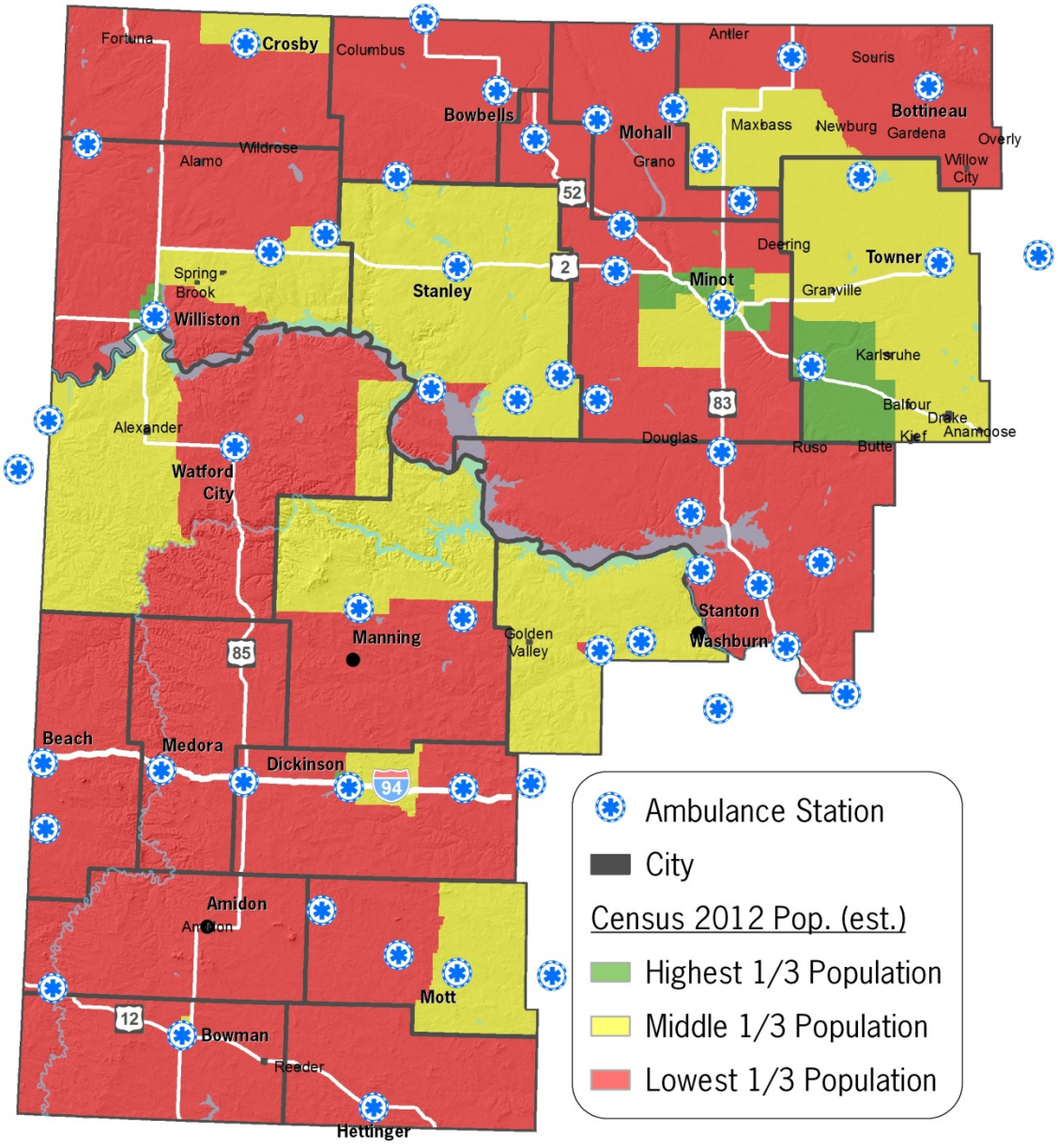

Figure 3 – 2012 Census Population Estimates

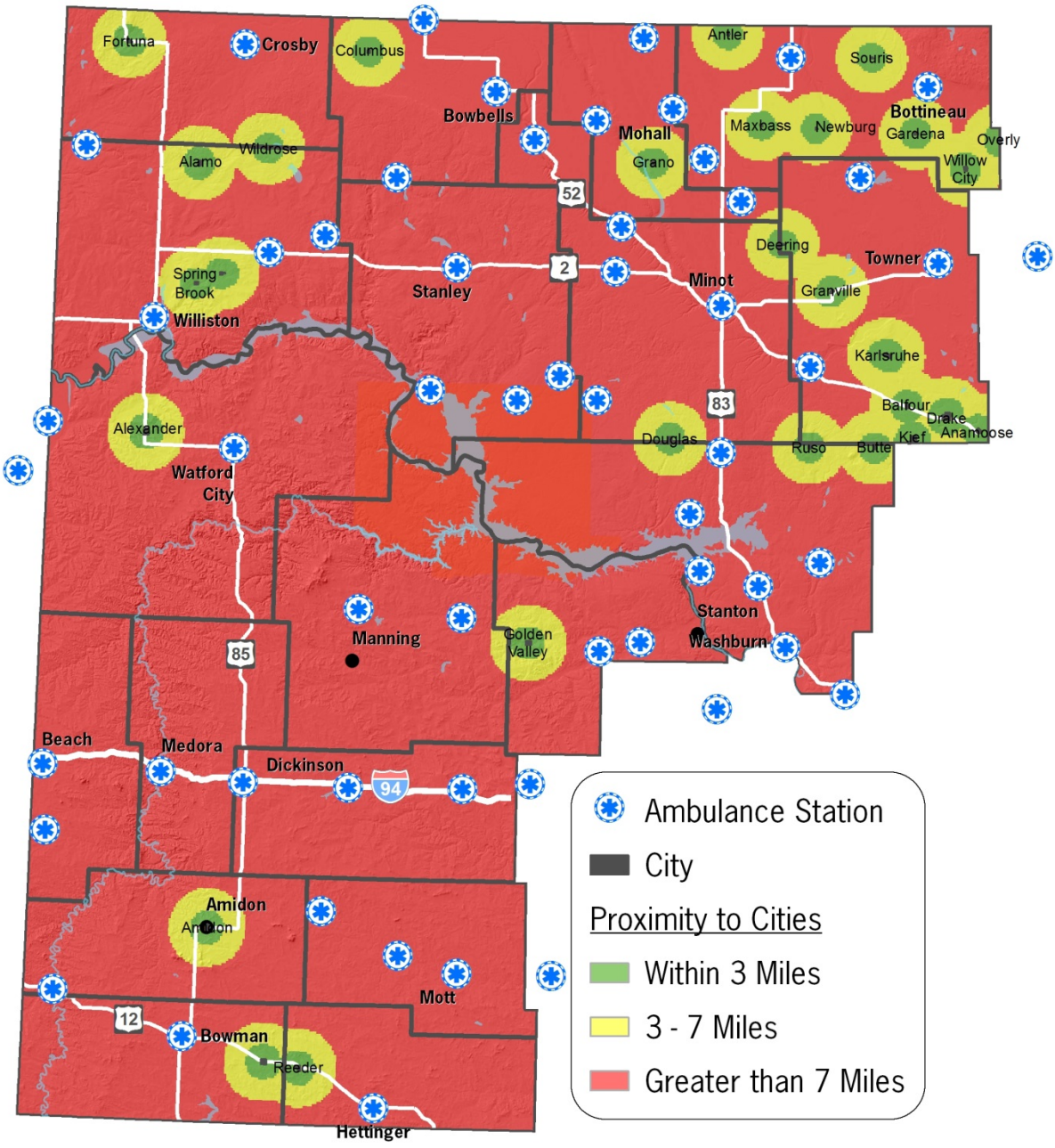

Figure 4 – Proximity to Cities

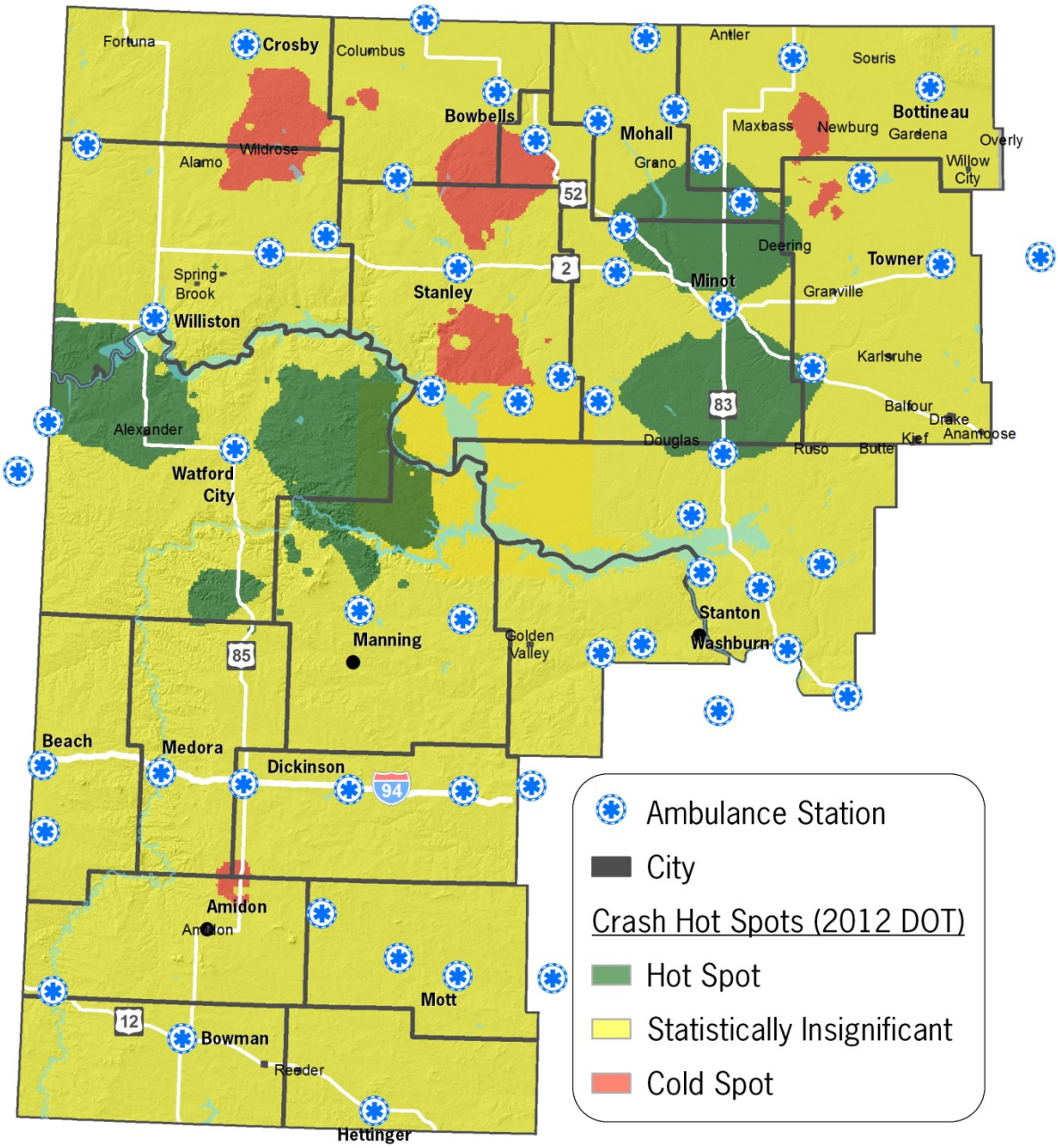

Figure 5 – DOT Crash Data Hot Spot Analysis

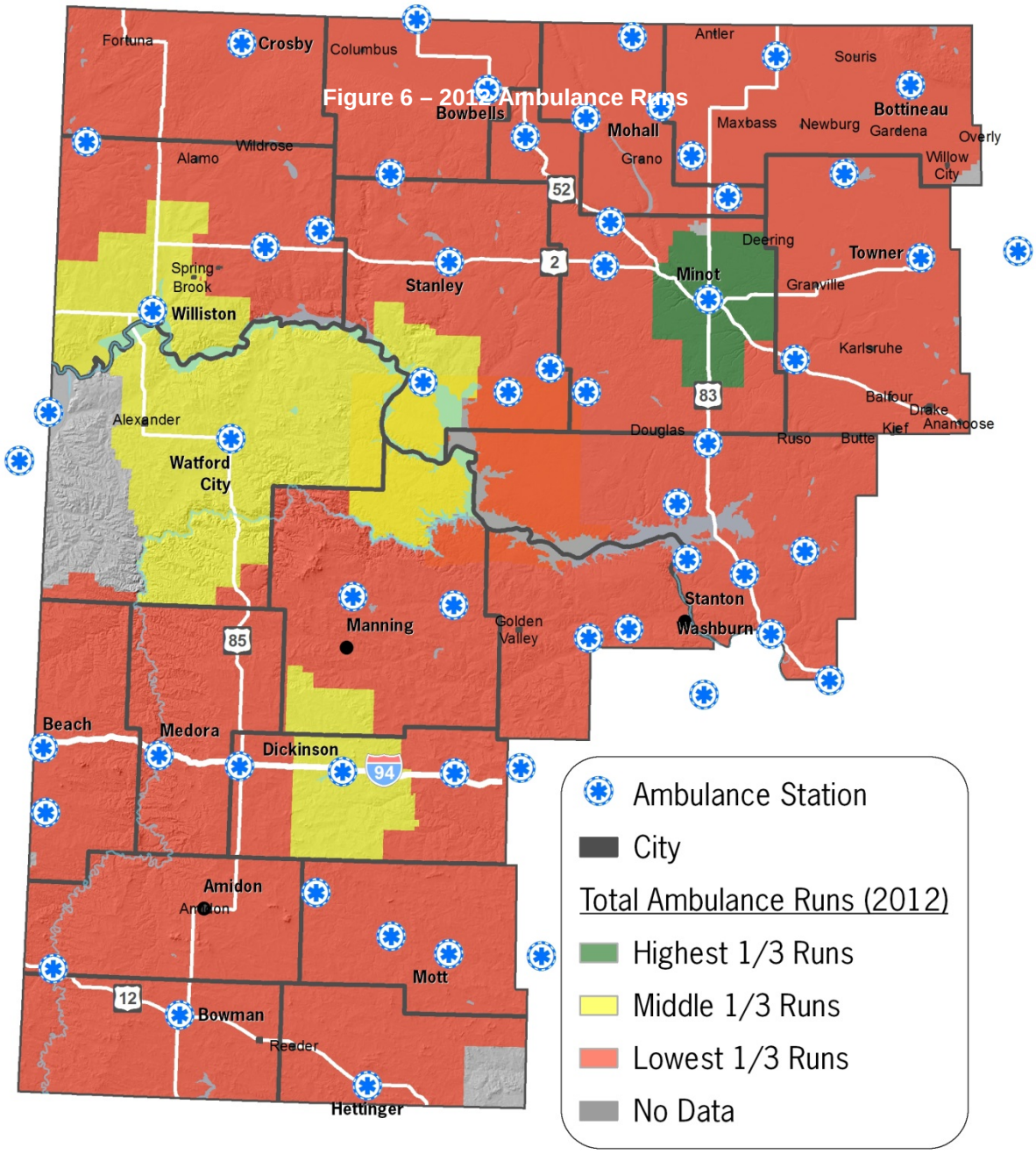

Figure 6 – Ambulance Runs

Results

The results of the weighted overlay analysis found several areas of high suitability: west central McKenzie county centered around Alexander (likely the majority of western McKenzie would have been shown as high suitability if ambulance runs were available for entire county), western area of the Fort Berthold reservation, southwestern area of Mountrail County, area near Gladstone, the area surrounding Spring Brook in Williams County, and the outlying areas of Minot (Figures 7 and 8). This data also corresponds to the location of oil well activity which can be a large source of ambulance runs (Figure 9). Finally, mapping the high suitability areas and the existing 14.7 minute drive-time coverages helps identify which greatest need areas are simply bordering existing coverage areas versus those lacking any nearby ambulance stations (Figure 10).

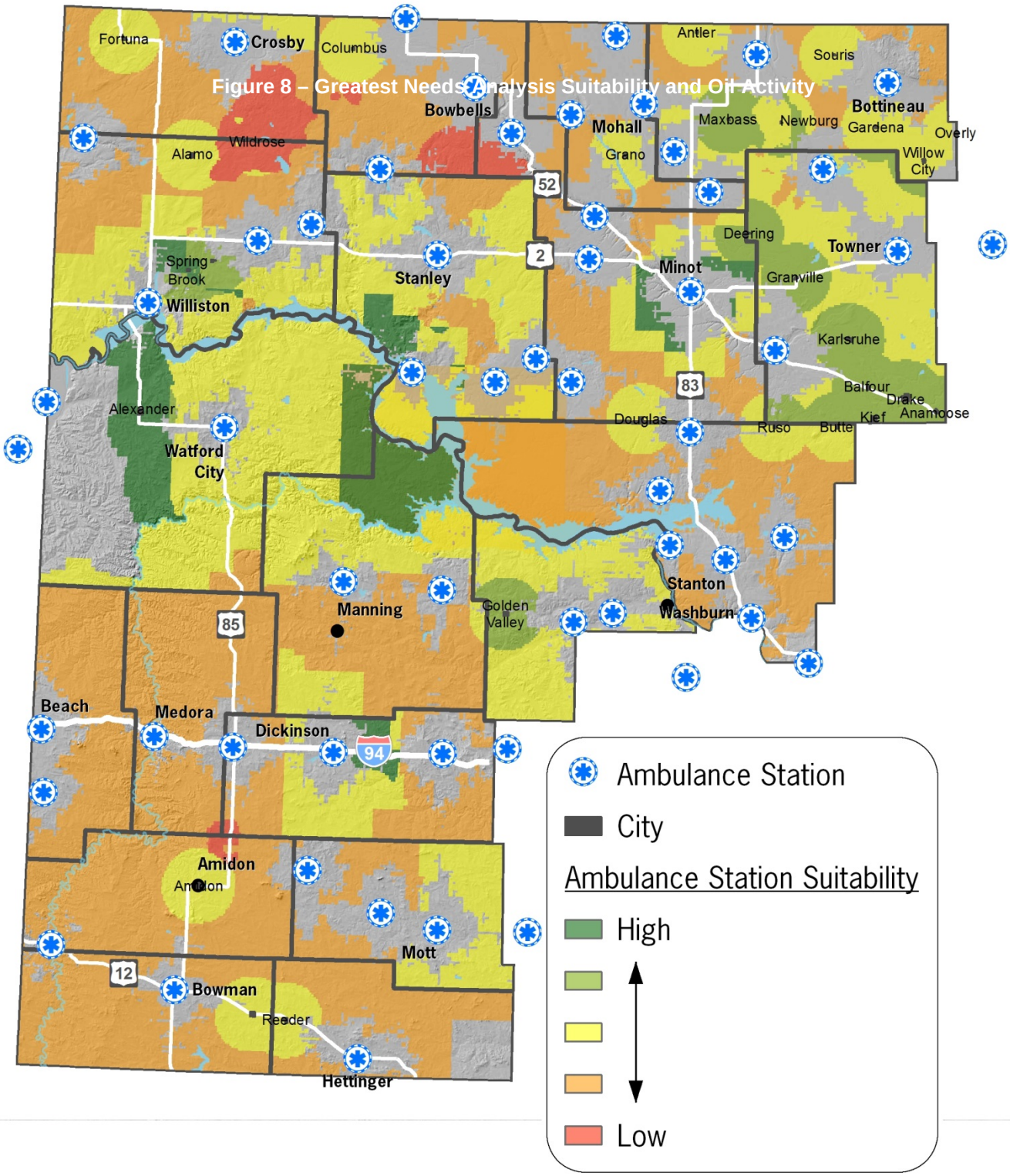

Figure 7 – Greatest Needs Analysis Suitability

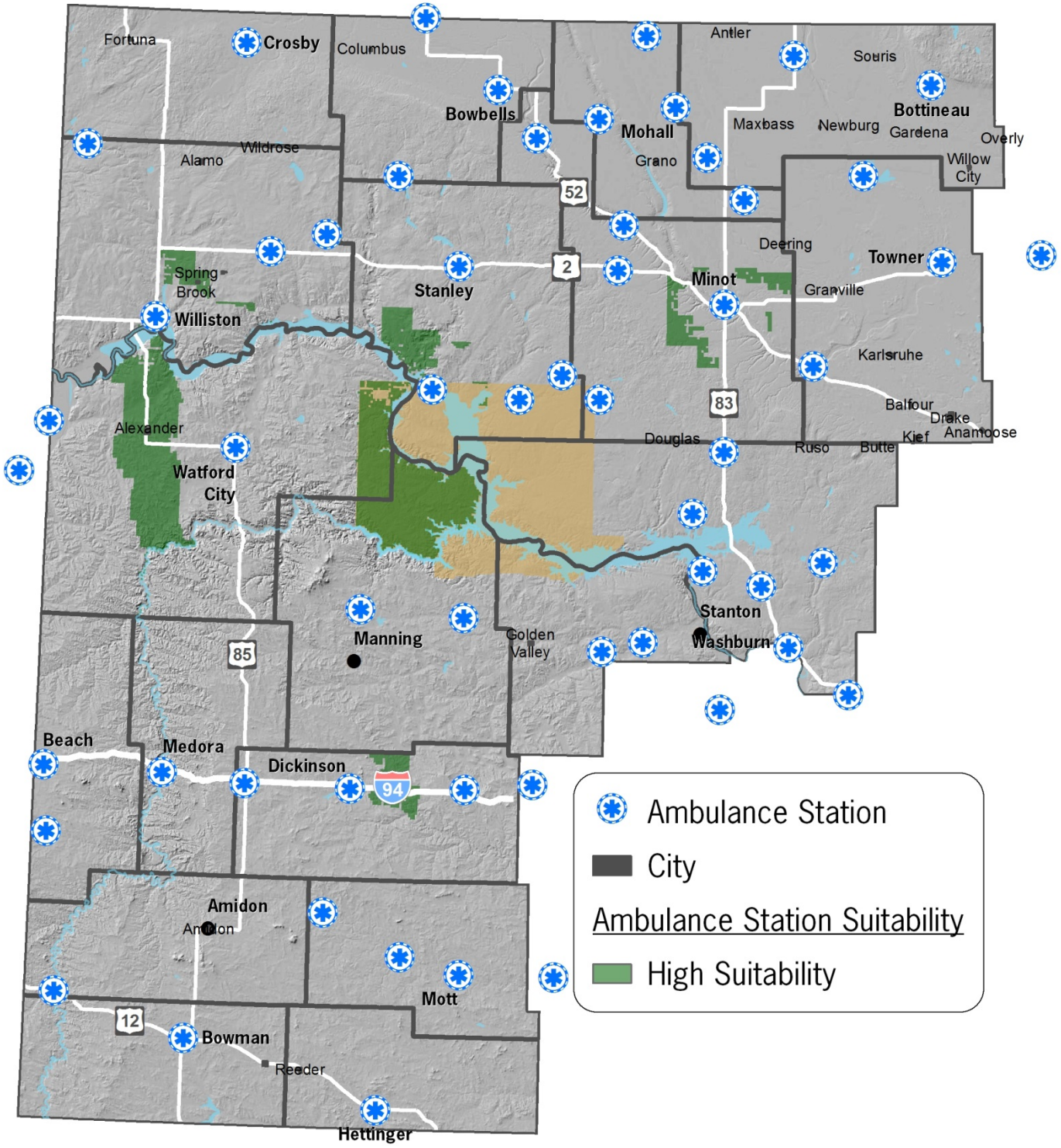

Figure 8 – Greatest Needs Highest Suitability

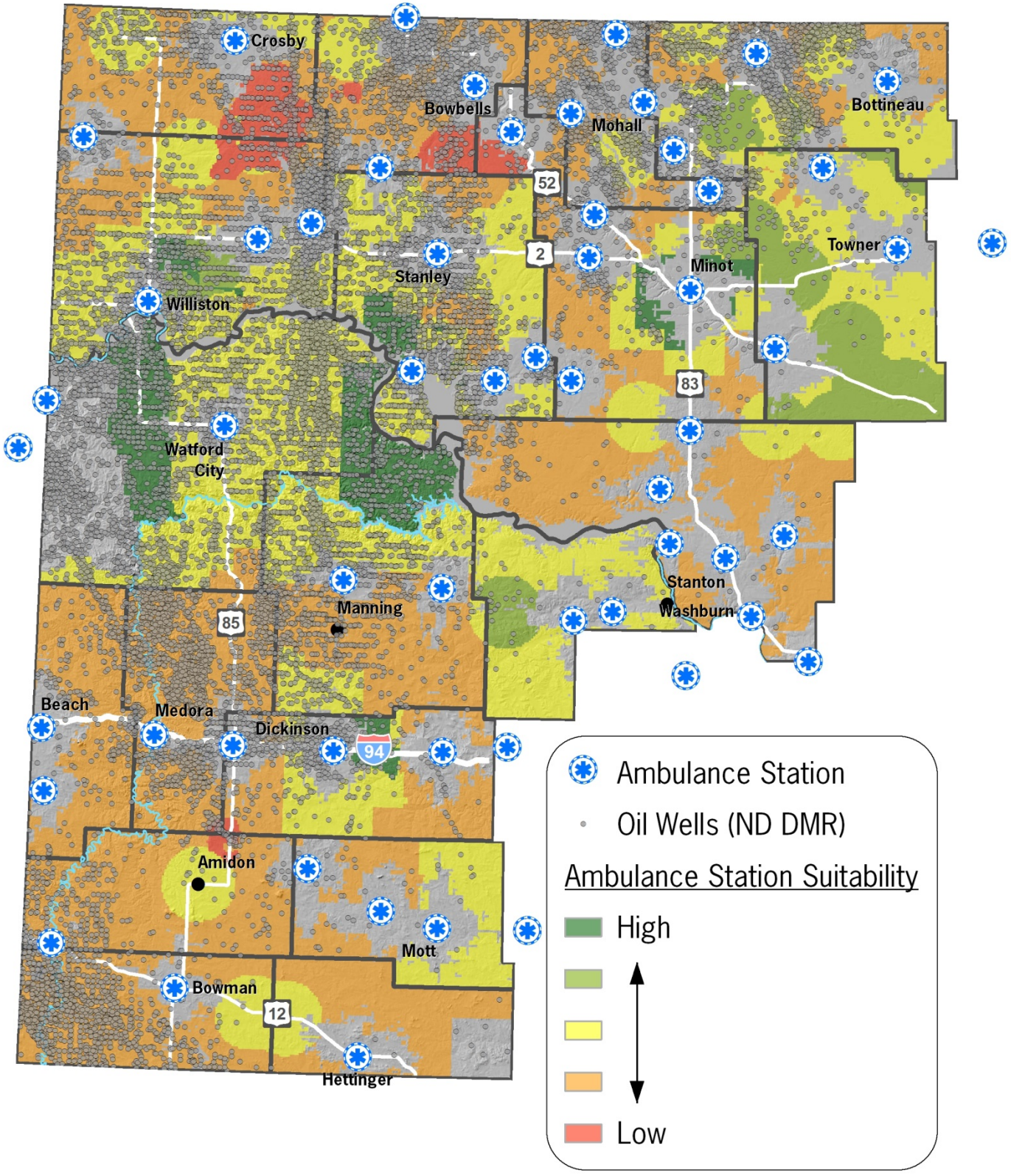

Figure 9 – Greatest Needs Analysis Suitability and Oil Well Activity

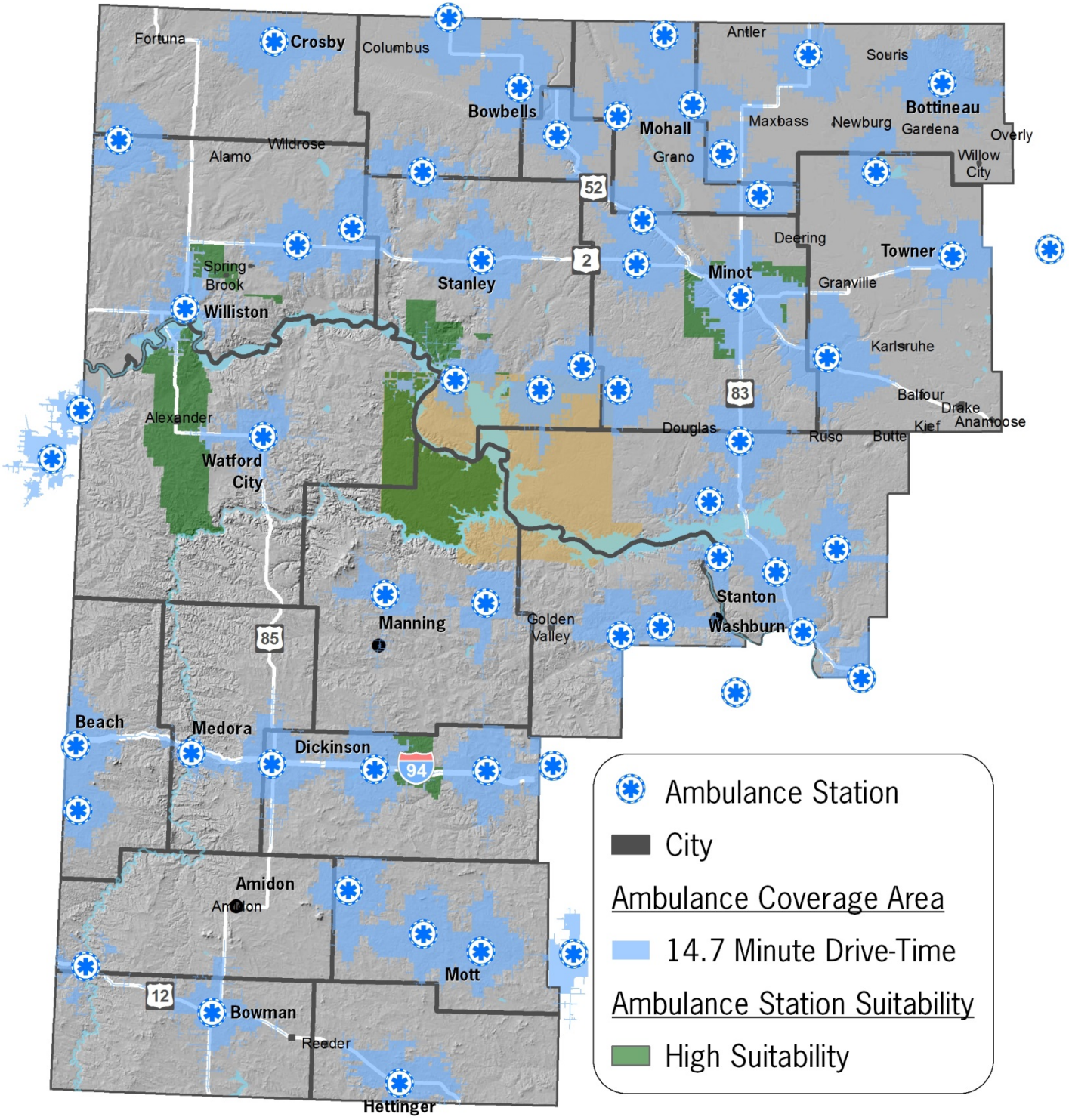

Figure 10 – Highest Suitability and existing 14.7 Minute Drive-Time