

Structurally Deficient Bridges in Massachusetts

Introduction

The National Bridge Inventory (NBI) is a collection of information (database) covering the more than 700,000 bridges located on public roads, including Interstate Highways, U.S. highways, State and county roads, as well as publicly-accessible bridges on Federal lands. It presents a State by State summary analysis of the number, location, and general condition of highway bridges within each State. The focus of this project is the condition of the more than 2,400 bridges within the State of Massachusetts (refer to Figure 1).

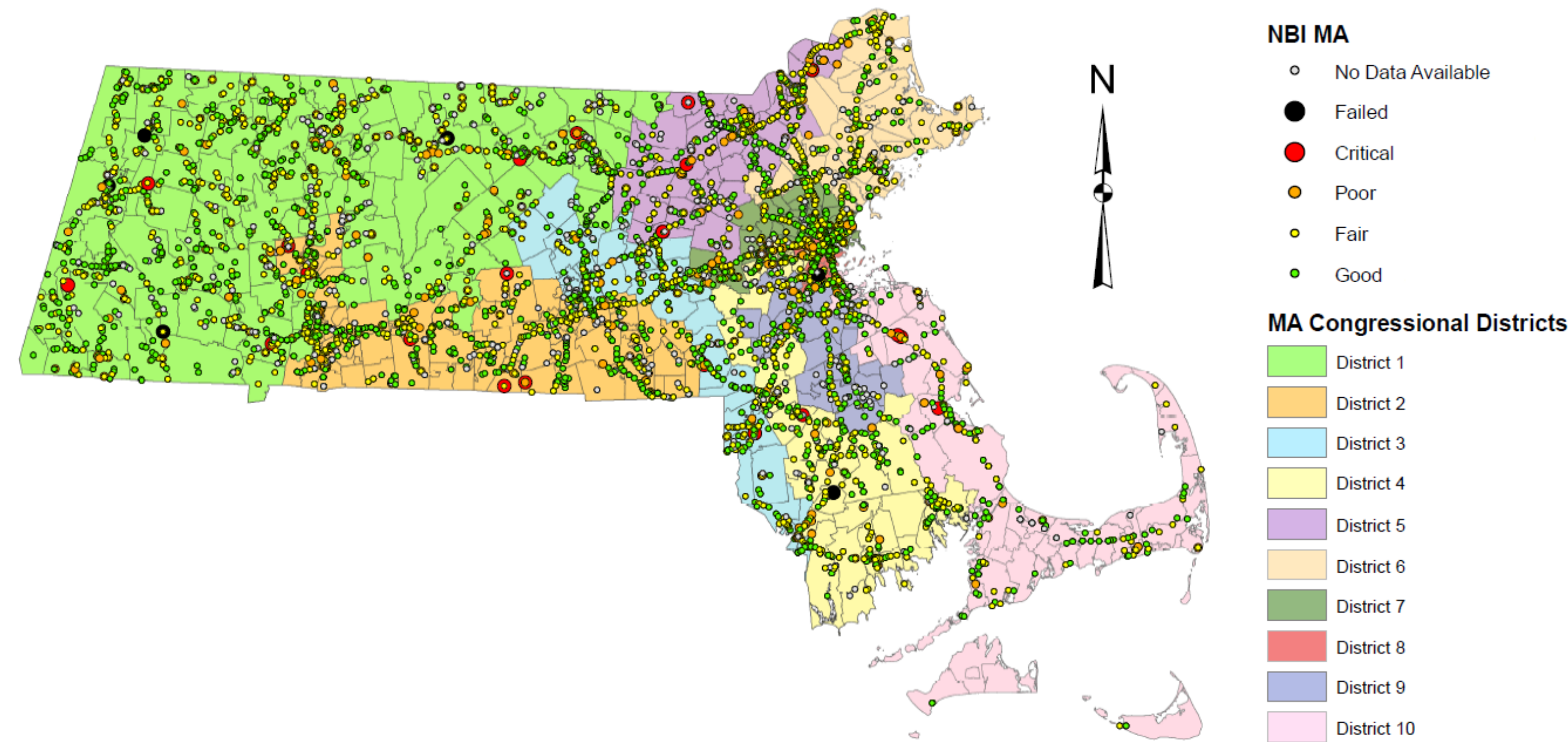


Figure 1: Bridge Conditions in Massachusetts by Congressional District

More with Structurally Deficient Bridges...

Another way of displaying structurally deficient bridges within Massachusetts is the use of inside-summarized spatial joins (refer to Figure 3). This map illustrates an approximate number of structurally deficient bridges within each community based on the range given below. Figure 3 is a great way to summarize Figure 2 when one is simply interested to an approximate number of structurally deficient bridges within a certain community.

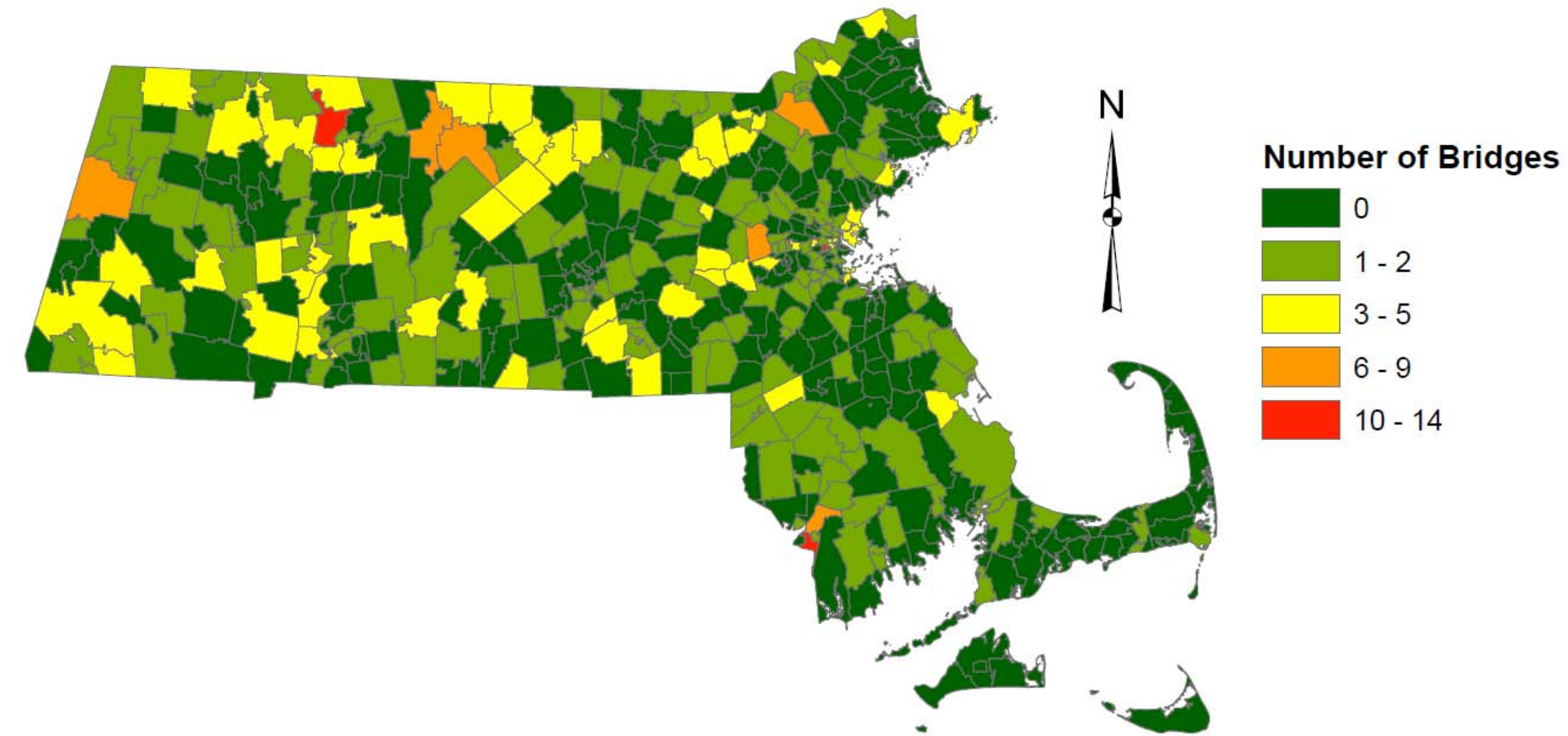


Figure 3: Number of Structurally Deficient Bridges within each Town and City

What is a Structurally Deficient Bridge?

The term structurally deficient has two definitions; The most common is the Deck, Superstructure, Substructure and/or Culvert condition rated 4 or less (poor or worse condition). The other, less common, definition is structural condition or waterway adequacy rated 2 or less which means very low load rating and bridge needs replacement or frequently floods causing traffic delays. It is also noted that the FHWA does not count those bridges that were built or reconstructed within the last 10 years as structurally deficient or functionally obsolete – 10 year rule. Using an algorithm within ArcGIS we can display every structurally deficient bridge within the State of Massachusetts from the NBI MA data layer (refer to Figure 2).

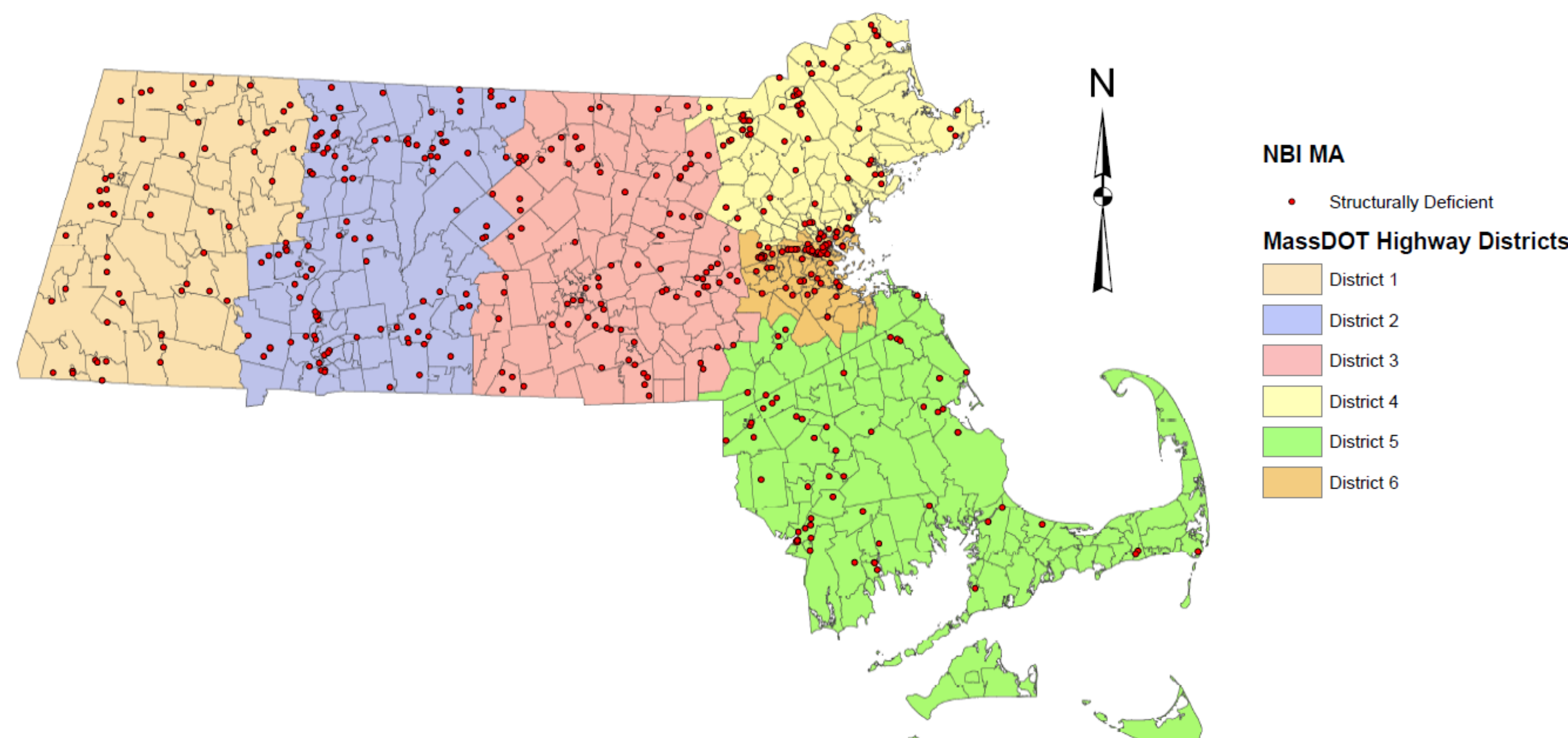


Figure 2: Structurally Deficient Bridges in Massachusetts by MassDOT District

Structurally Deficient Bridges versus 2010 Population Data...

Lastly, we used in the most recent 2010 U. S. Census Data to see if there is any correlation in those areas with more or less population versus the locations and amount of structurally deficient bridges within those communities (refer to Figure 4). This map displays all structurally deficient bridges in Massachusetts along with ranges of population data from the 2010 Census Data. Generally in those areas with population greater than 9000, there was an increase in structurally deficient bridges versus those areas that had less than 9,000 population. The data shows larger clusters of structurally deficient bridges within the more densely populated areas and gently disperses as the population decreases

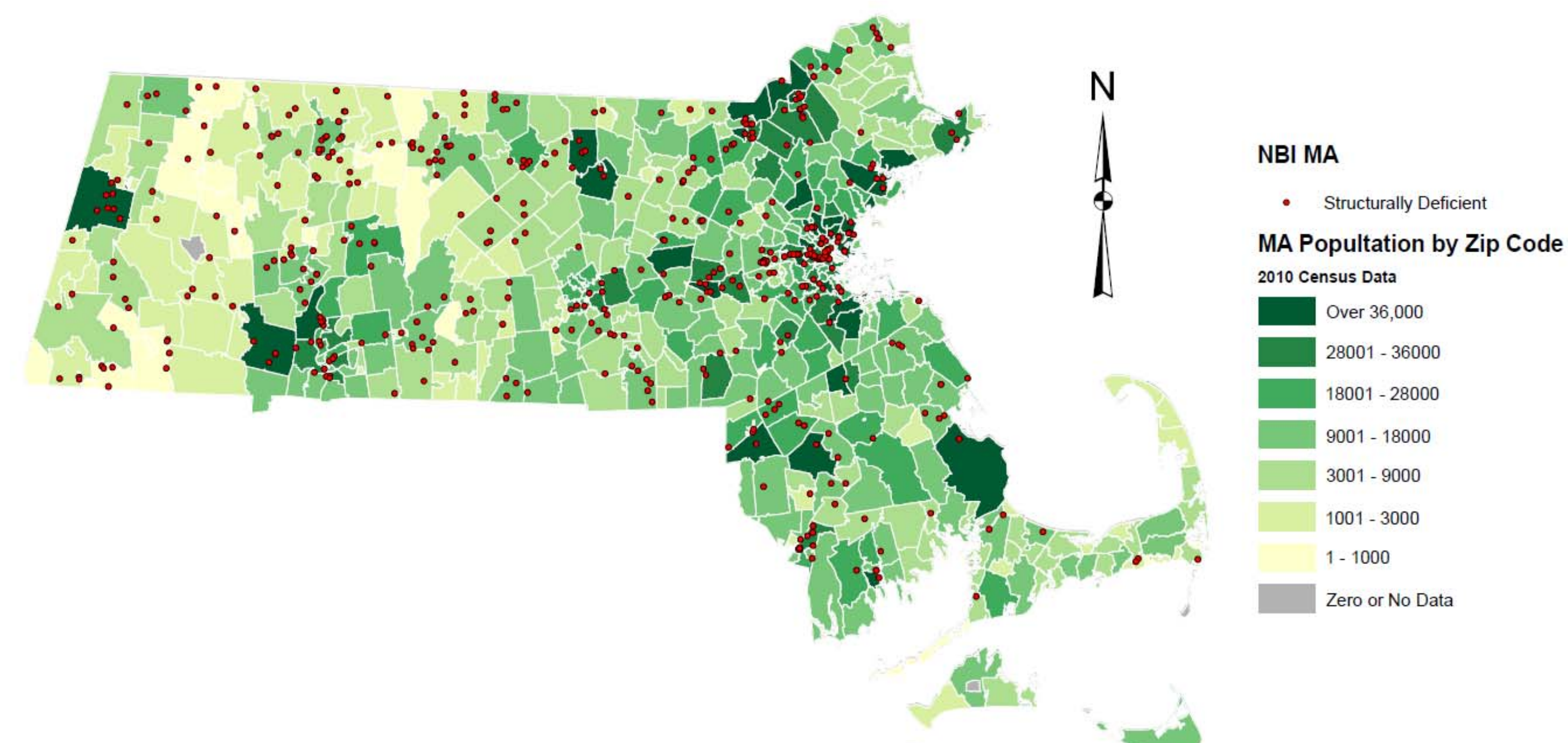


Figure 4: Structurally Deficient Bridges versus 2010 Population Data

Conclusions

Out of the more than 2,400 bridges throughout the State of Massachusetts there are only 437 bridges that are structurally deficient and over 2,000 that are rated at fair condition or better. Based on that statistic there is approximately 18% of all bridges within the state that are structurally deficient.

Massachusetts has programs in place to fix our bridges. The most well-known is the historic \$3 billion Patrick-Murray Accelerated Bridge Program (ABP), which represents a monumental investment in Massachusetts bridges. This program will greatly reduce the number of structurally deficient bridges in the state system, while creating thousands of construction jobs on bridge projects.

To complete this program MassDOT and DCR will rely on the use of innovative and accelerated project development and construction techniques. As a result, projects will be completed on-time, on-budget and with minimum disruption to people and to commerce.

Since 2008, the number of former MassHighway and DCR structurally deficient bridges has dropped from 543 to 437, a decline of 19.5%. As of September 1, 2012 the ABP Program has completed 102 bridge projects, with another 67 bridge projects currently in construction, and an additional 19 bridge projects scheduled to start construction within the next year. Over the course of the eight year program, more than 200 bridges are planned to be replaced or repaired



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Projection: NAD 1983 State Plane
 Massachusetts FIPS 2001 (US Feet)

Data Sources: United States Department of Transportation (U.S. DOT), Federal Highway Administration (FHWA) - National Bridge Inventory (NBI), Massachusetts Department of Transportation (MassDOT), Massachusetts Department of Conservation and Recreation (DCR), United States Census Bureau (in particular - 2010 Census Data)