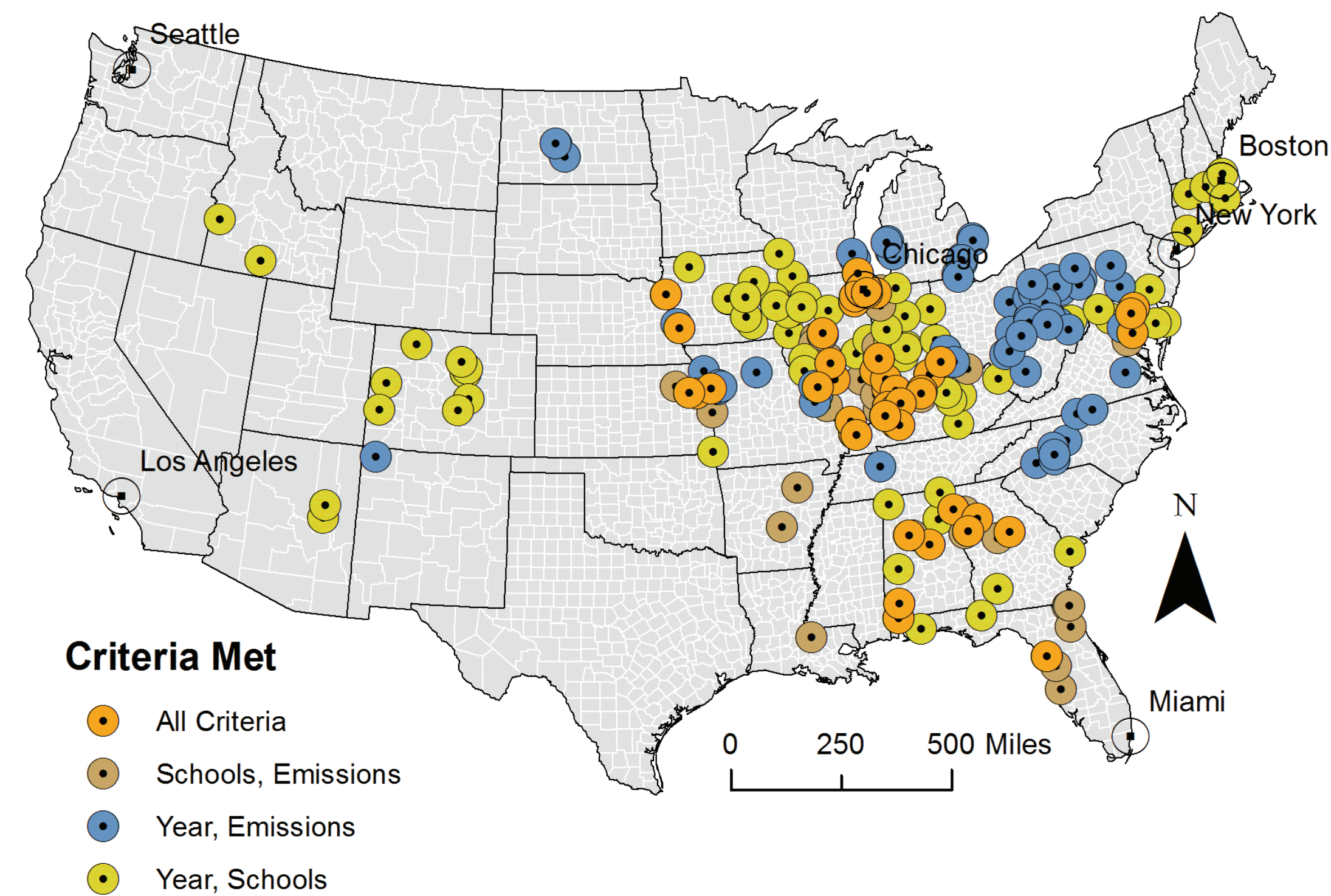


# Evaluation and Prioritization of Coal-Fired Power Plants for Conversion to Natural Gas



below. Next, plants that went online prior to 1970 were selected and a map was produced depicting the results. Finally, a shapefile containing the location of schools was collected from the ESRI Data in ArcMap10. The Point Distance tool was utilized to select schools that were located within one mile of a power plant and a map was produced illustrating the results.

The three categories were collected on one attribute table and fields were added which allowed each power plant to be flagged when any of the aforementioned criteria were met (Year\_Flag = Y, Emit\_Flag = E and School\_Flag = S). The flags were summarized in a fourth column (All\_Flag). The data presented to the left depicts the power plants that met all three (YES), or at least two of the criteria (SE, YE, or YS).

## RECOMMENDATIONS

According to the U.S. EPA eGRID data, there are approximately 553 coal-fired power plants in the lower 48 states. Over 300 of these plants were brought online prior to 1970. In addition, approximately 205 of these plants are located within one mile of a school. Based on the contributions from power plants, numerous counties are exposed to greater than 2,000 tons per square mile of CO<sub>2</sub> emissions (calculated utilizing the 2009 eGRID data). Based on this analysis, it is recommended that coal-fired power plants that went online prior to 1970 (flagged as "Y"), are located within one mile of a school (flagged as "S") and are located in a county where over 2,000 tons of CO<sub>2</sub> are produced from the plants (flagged as "E") be prioritized for conversion to natural gas or removed from service. This includes a total of 48 power plants, located primarily in the Midwest and the South. This type of analysis illustrates the type of information that could be utilized to assist with the development of forward-thinking energy policies aimed at reducing emissions from power plants.

Projected Coordinate System: U.S. National Atlas Equal Area (Meters)

Cartographer: Michael Coty

Date: May 6, 2013

Tufts University Urban Environmental Policy and Planning

### DATA SOURCES

U.S. Environmental Protection Agency Emissions and Generation Resource Integrated (eGRID) Database (2012); ESRI Data ArcMap10



## INTRODUCTION

Coal-fired power plants are one of the largest anthropogenic sources of carbon dioxide (CO<sub>2</sub>) emissions. Their replacement represents a significant opportunity to reduce greenhouse gas emissions and address climate change. Natural gas, due to its relative abundance through recently discovered sources (primarily through hydraulic fracturing), represents a likely replacement fuel. Natural gas offers an opportunity for significant reductions in particulate and CO<sub>2</sub> emissions. Coal-fired power plants contribute numerous airborne particulates and contaminants and present serious health issues. Individuals living near power plants are often at greater risk to health problems as compared to the general population. Children are especially susceptible to these health problems, such as asthma. In prioritizing coal-fired power plants for conversion or removal, it would be beneficial to consider those power plants that are located near sensitive populations, such as children.

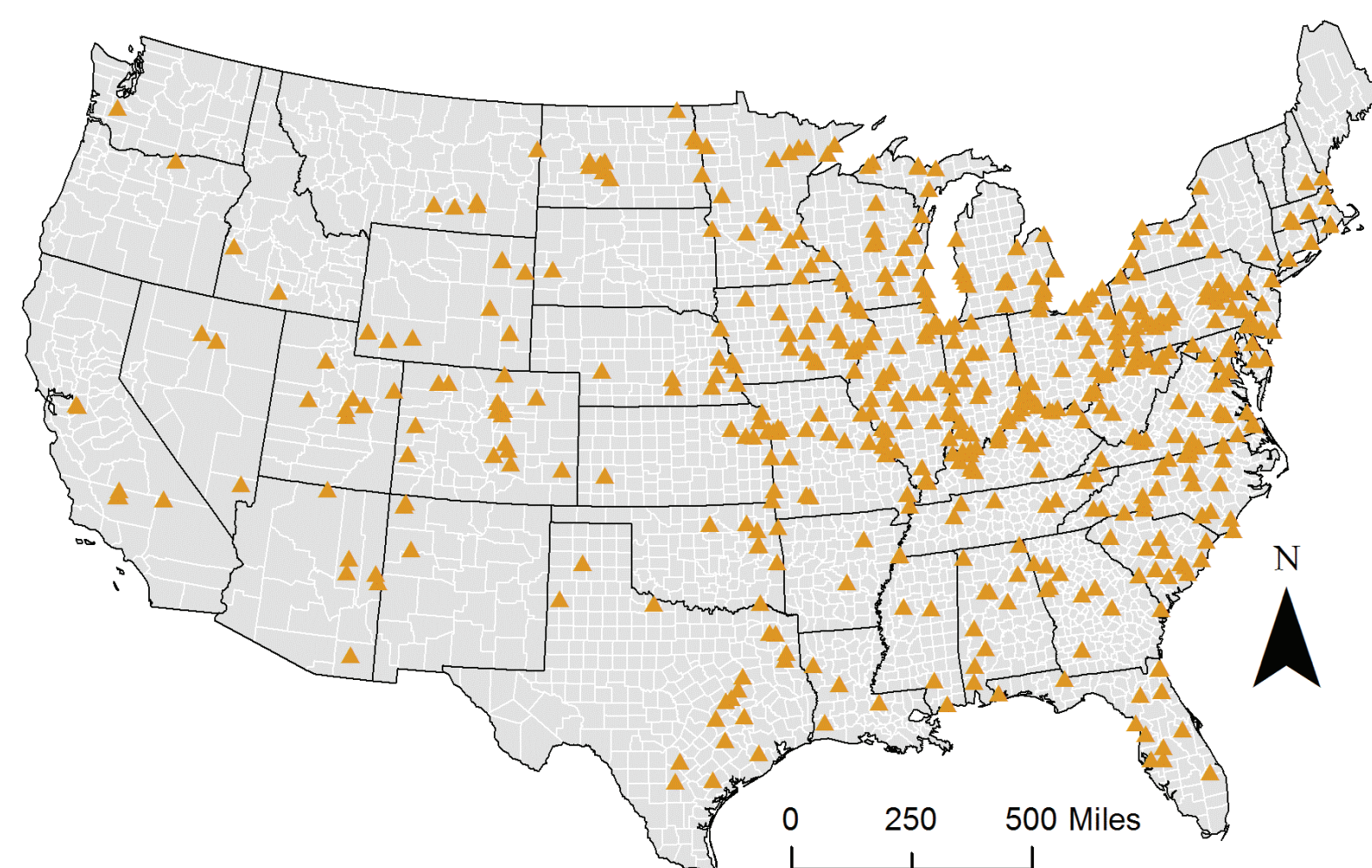
One of the most significant factors in determining the efficiency of power plants, including emissions output, is the age of the facility. According to the U.S. Environmental Protection Agency (EPA) Emissions and Generation Resource Integrated Database (eGRID), there are over 300 coal-fired power plants that were brought online prior to 1970. Targeting these power plants for replacement would offer the opportunity to reduce CO<sub>2</sub> and particulate emissions.

## METHODOLOGY

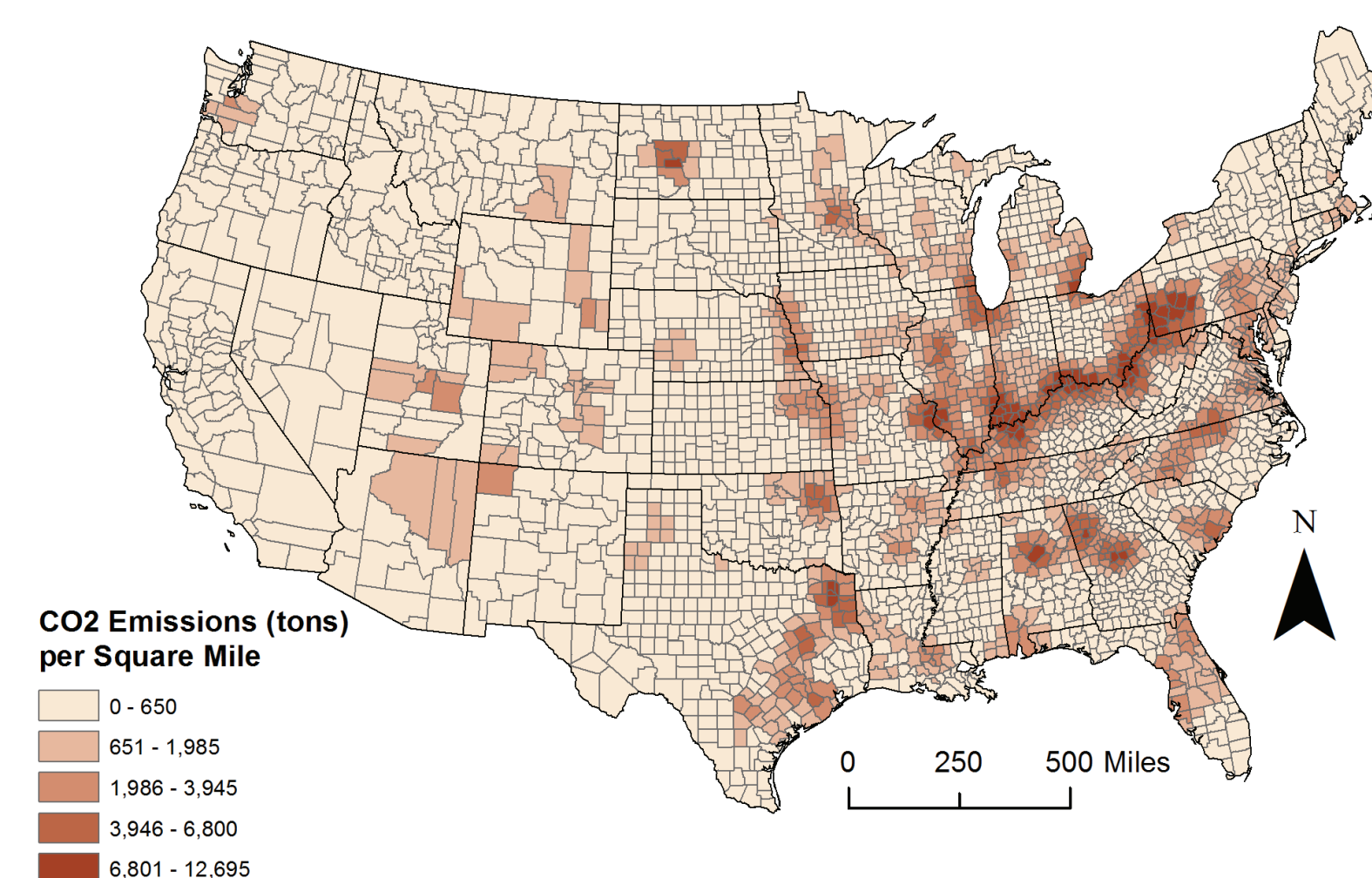
This analysis attempted to identify coal-fired power plants for conversion to natural gas or for removal in their entirety. Three criteria were utilized in this analysis: 1) the mean density of CO<sub>2</sub> emissions emitted from the power plant in tons per county (note that data from 2009 was utilized as it includes the most recent information available); 2) the age of the power plant; and 3) the proximity of the power plant to a school.

Information regarding the location of power plants, CO<sub>2</sub> emissions and age was provided by the U.S. EPA through their eGRID database. Prior to beginning this analysis, a map was created illustrating the location of coal-fired power plants located in the lower 48 states (for this analysis we chose to focus on the lower 48 states only). A raster layer was developed utilizing the Kernel Density function to illustrate the quantity of CO<sub>2</sub> emissions from each power plant located in the lower 48 states. Using the Zonal Statistics as Table tool, the emissions data was joined to a U.S. county polygon shapefile. This provided a summary of CO<sub>2</sub> emissions per square mile from coal-fired power plants by county. For this analysis, power plants that were located in counties that emitted greater than 2,000 tons of CO<sub>2</sub> were flagged, as described

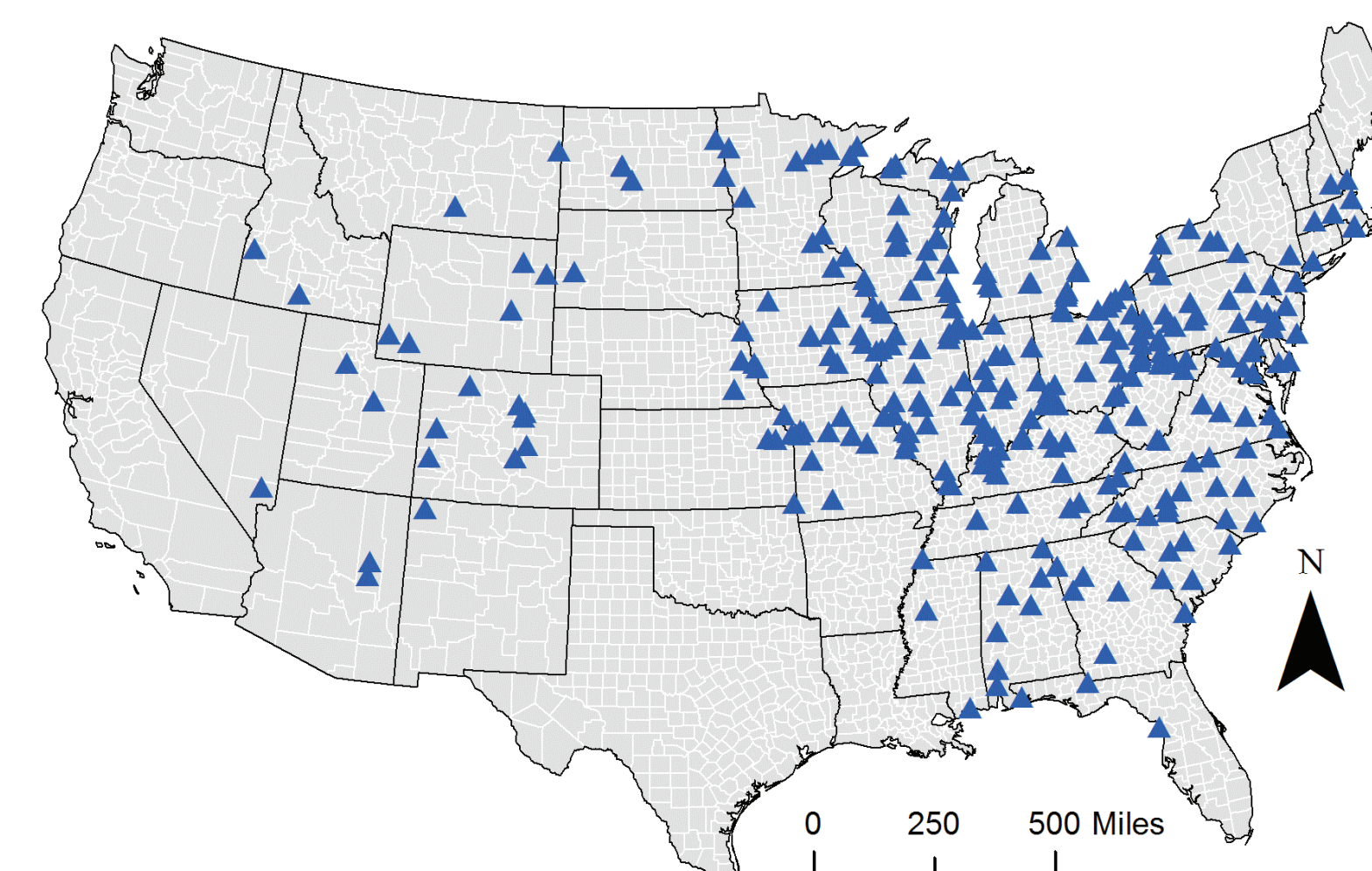
Coal-Fired Power Plants in the Lower 48 States



Estimated Mean Density CO<sub>2</sub> Emissions (2009) from Coal Power Plants by County



Coal Plants Online Prior to 1970



Coal Plants Located Within 1 Mile of School

