Distribution Analysis

This section presents charts depicting the distributions of the comparison scores as well as the individual and collective reported crime rates shown in *City Crime Rankings* to provide a mechanism of comparison beyond the rankings included in each analysis. The histograms in this section illustrate the distribution of values for the comparison score analyses as well as for the overall, violent, and property crime rate analyses. Along with each histogram, measures of central tendency, such as median, mean, standard deviation, and minimum and maximum values, are reported to provide further description of each distribution.

In each histogram (formatted as area charts for easier viewing), the values of the scores or rates are shown along the bottom (x-axis) and the frequency of cases (i.e., metro areas or cities) are shown along the left (y-axis). The values along the bottom are ranges for which the frequency of cases is totaled. These ranges and frequencies are different for each distribution, in this case, each histogram.

The median indicates the middle value of the distribution, meaning that 50% of the metro areas or cities have scores or rates above that value, and 50% have scores or rates below it. The mean is the average value of the distribution, and the standard deviation, described generally, is the measure of spread of all the values from the mean. The minimum and maximum values are the lowest and highest values of the distribution, respectively.

These statistics are based on a normal curve, so one standard deviation above and below the mean contains 68% of the distribution, two standard deviations above and below the mean contain 95% of the distribution, and three standard deviations above and below the mean contain 99.7% of the distribution. The use of these statistics is purely descriptive, but it does help the reader assess the distribution as a whole as well as illustrate where an individual value sits in terms of all the other values. For example, if a score is two or three standard deviations above or below the mean, it may be considered an outlier because it falls with only 5% or .3% of the values, respectively.

For example, Figure 1 depicts the comparison scores for metro areas in 2010. The median is –3.9, the mean is –3.3, the standard deviation is 36.4, the minimum value is –76.3, and the maximum value is 174.6. These statistics are interpreted as follows:

- The lowest comparison score for metro areas is –76.3.
- The highest comparison score for metro areas is 174.6.

- The range of scores (maximum minus minimum) is 250.9.
- 50% of the metro areas have comparison scores lower than –3.9, and 50% have scores higher than –3.9.
- The average comparison score for metro areas is –3.3 and the standard deviation is 36.4.
- 68% of the metro areas have scores between –39.7 and 33.1.
- 95% of the metro areas have scores between –76.1 and 69.5.
- 99.7% of the metro areas have scores between –112.5 and 105.9. (The fact that the lower end of this range (–112.5) is less than the minimum value of the distribution (–76.3) indicates the distribution is skewed.)

Assessing the score of –44.81 for the metropolitan area of Fort Collins-Loveland, Colorado, for example, reveals that it is in the lower 50% of all the scores (below the median) and falls within the second standard deviation of the mean with 95% of the other scores (between –76.1 and 69.5).

The remainder of this section presents a total of six charts and sets of statistics for both metropolitan areas and cities in the categories listed here:

1. Comparison Score
2. Overall Crime
3. Violent Crime
4. Property Crime

A word of caution: These distribution analysis charts and statistics are provided to help the reader understand the nature of the values within each analysis, but the analyses are still based on data that must be interpreted within the constraints noted earlier. These charts are only descriptions of the data and do not provide predictions or explanations of why these values are different.

Missing Cities and Metropolitan Areas

To be included in the comparative analysis, cities and metro areas must report data for six crime categories: murder, rape robbery, aggravated assault, burglary, and motor vehicle theft. All metro areas and all cities with populations of 75,000 or more that reported crime data to the FBI were included. A number of
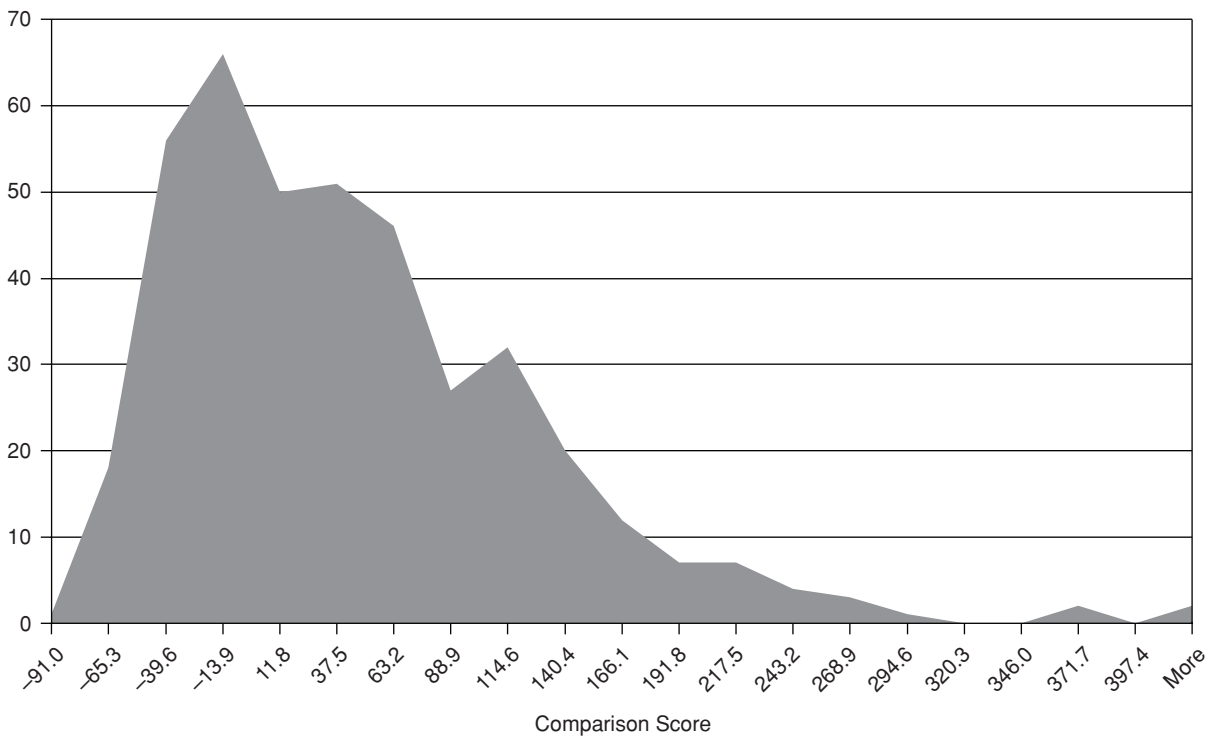
Figure 1   Metropolitan Areas Comparison Score Distribution Analysis for 2010
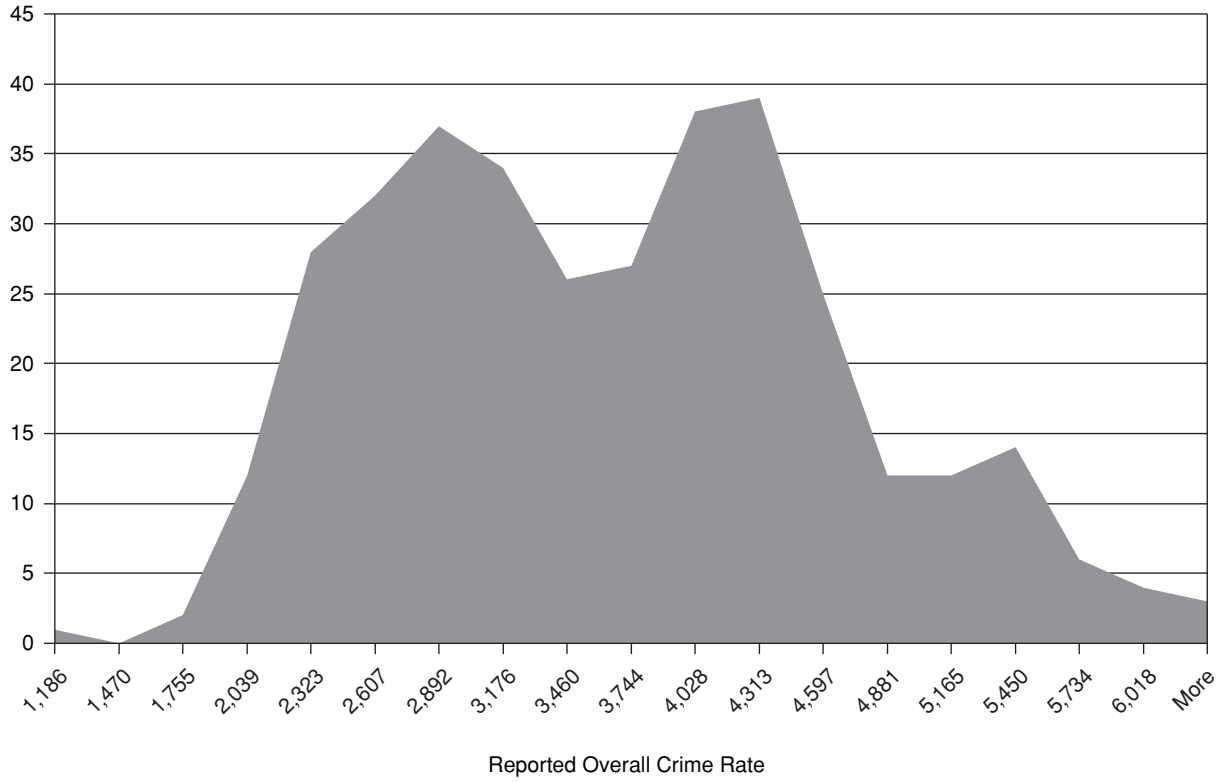
Frequency of MSAs
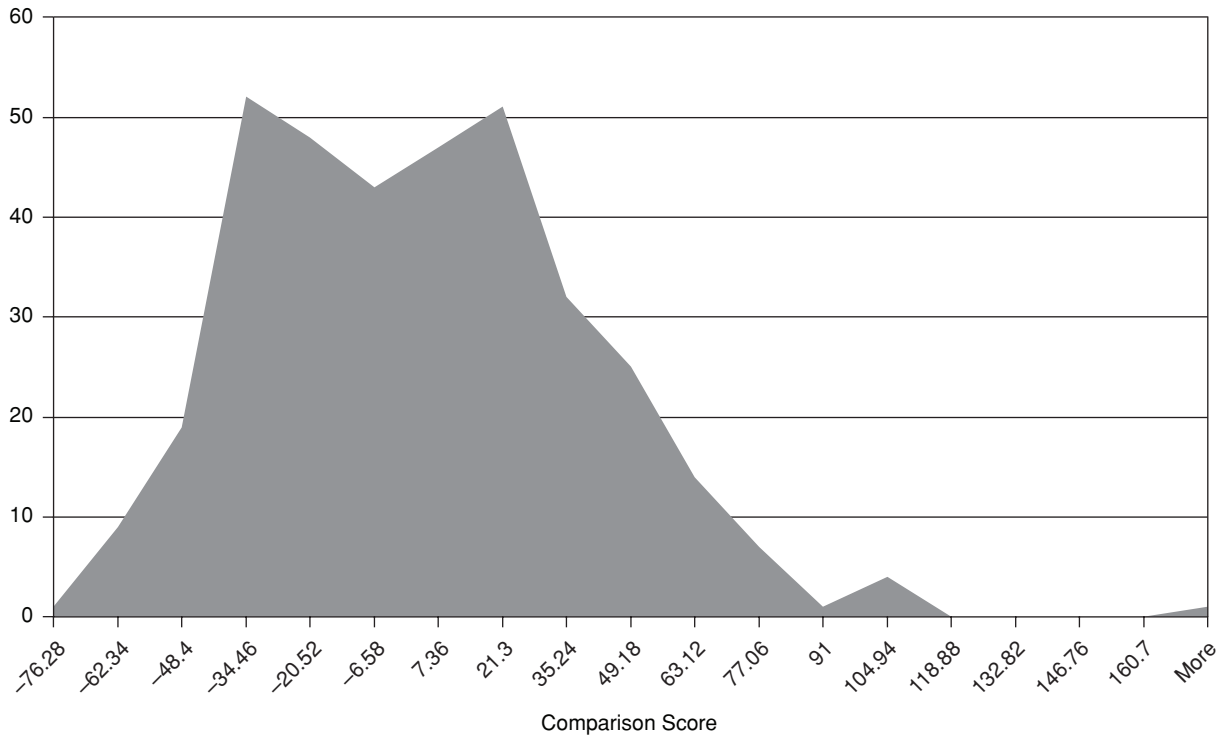
Comparison Score

Figure 2   Cities Areas Comparison Score Distribution Analysis for 2010
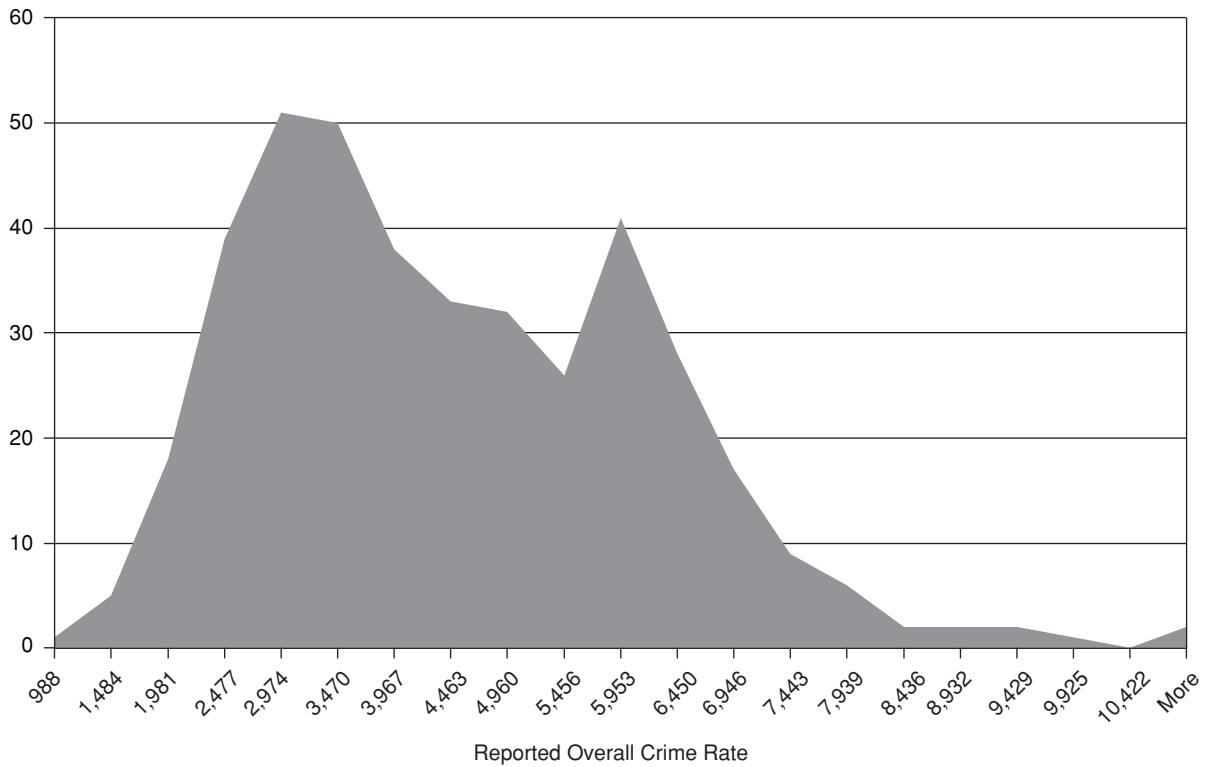
Frequency of Cities

Comparison Score

Figure 3   Metropolitan Areas Overall Reported Crime Rate Distribution Analysis for 2010
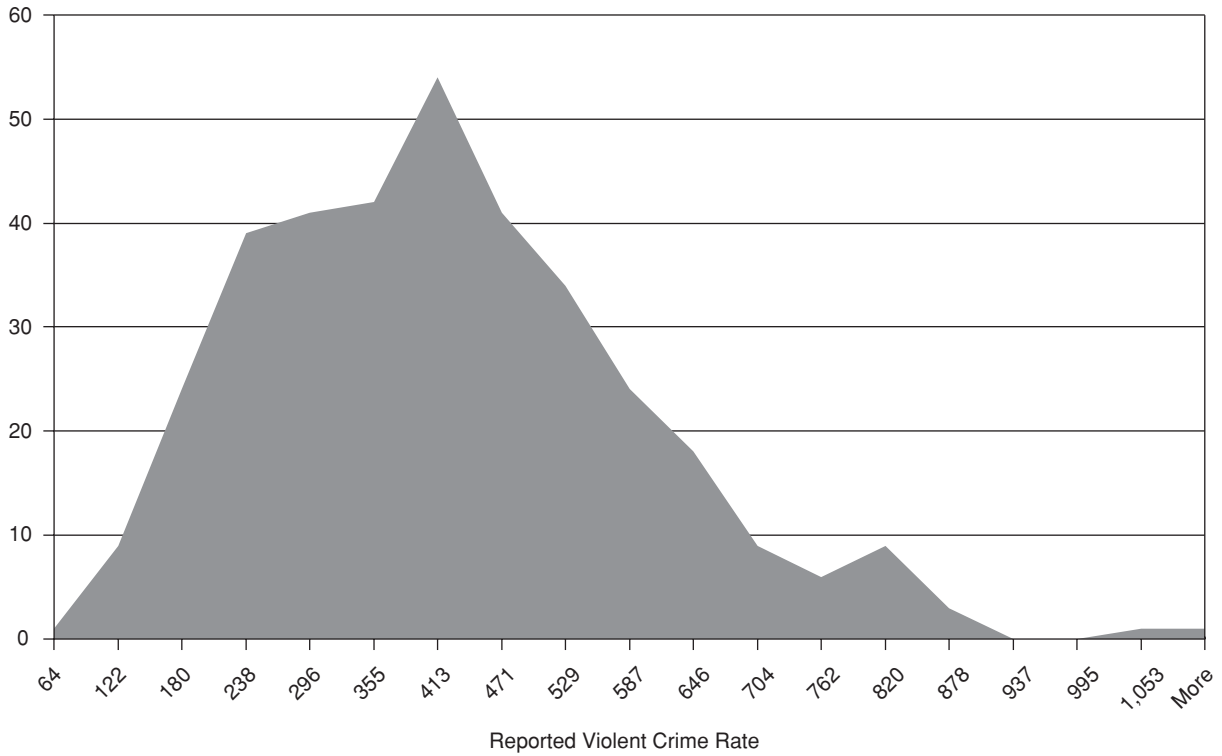
Frequency of MSAs

Reported Overall Crime Rate

Figure 4   Cities Overall Reported Crime Rate Distribution Analysis for 2010
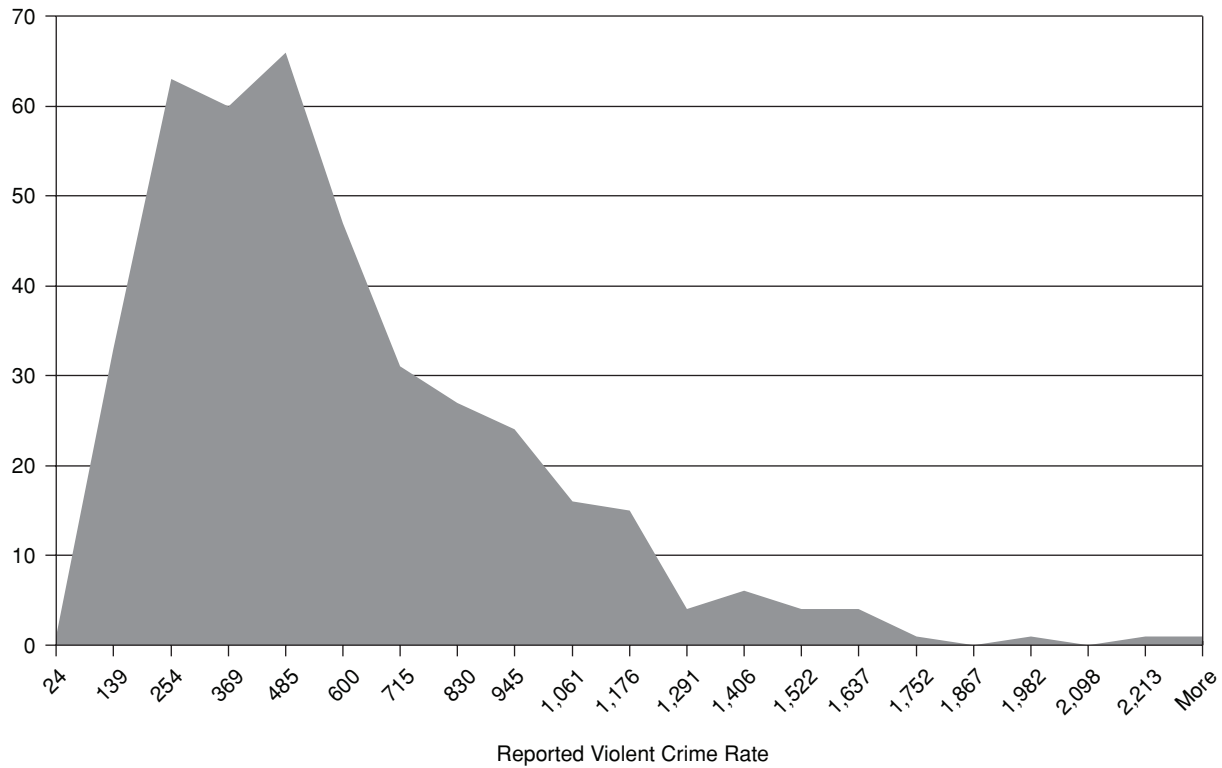
Frequency of Cities

Reported Overall Crime Rate

Figure 5   Metropolitan Areas Reported Violent Crime Rate Distribution Analysis for 2010

Frequency of MSAs

Reported Violent Crime Rate
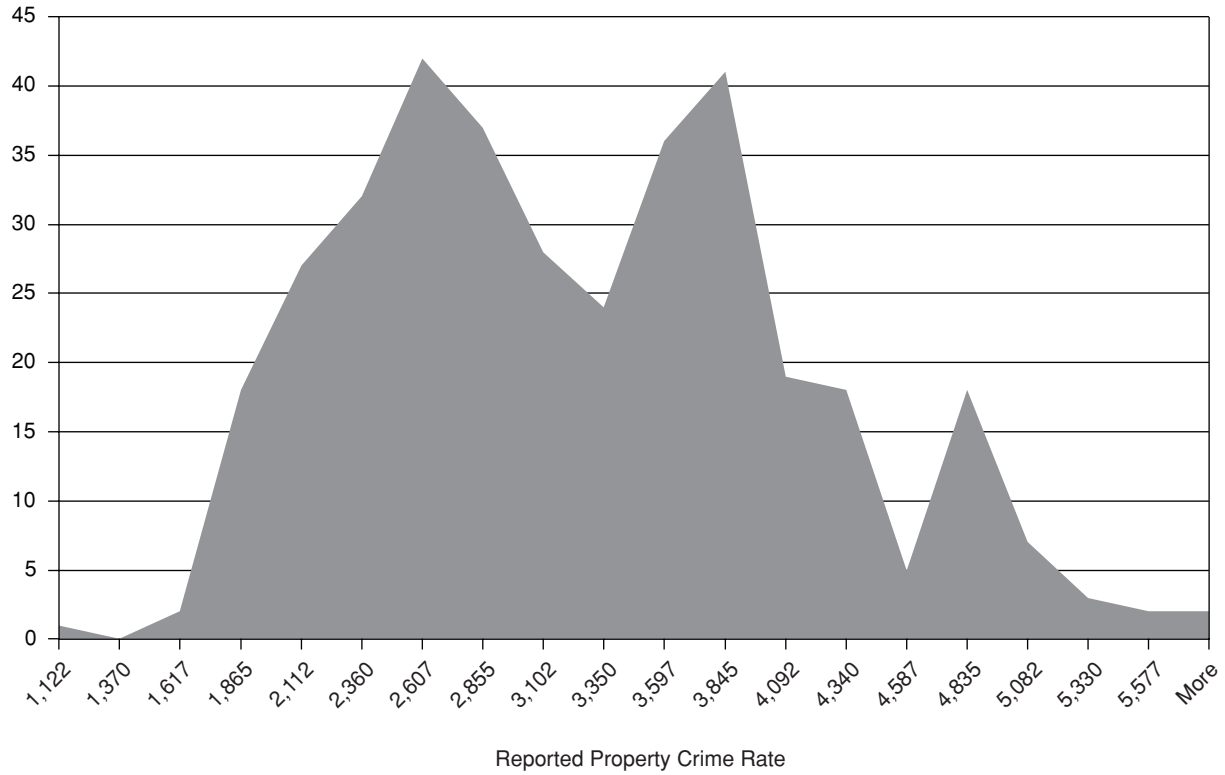
Figure 6   Cities Reported Violent Crime Rate Distribution Analysis for 2010

Frequency of Cities

Reported Violent Crime Rate

Figure 7   Metropolitan Areas Reported Property Crime Rate Distribution Analysis for 2010

Frequency of MSAs

Reported Property Crime Rate

Figure 8   Cities Reported Property Crime Rate Distribution Analysis for 2010

Frequency of Cities

Reported Property Crime Rate