

STATE OF FLORIDA



**2002
HIGHWAY PERFORMANCE
MONITORING SYSTEM
FACTS & FIGURES**

**FL/DOT/SMO/02-456
April 2002**

STATE MATERIALS OFFICE

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What Is HPMS?

The Highway Performance Monitoring System (HPMS) is an inventory system with an integrated database that provides essential information on the extent, condition, performance, use, and operating characteristics of the Nation's highway system.

What Purpose Does HPMS Serve?

The HPMS was developed in 1978 to address a need for a national highway transportation system database. Since then, several enhancements have sharpened its focus on timely issues and enhanced analytical tools.

Traditionally, HPMS data has been used to support informed highway planning, policy and decision making at the national, State, and local levels. This includes the apportionment and allocation of federal-aid funds as well as the determination of appropriate cost-effective strategies to rehabilitate and preserve existing highway transportation infrastructure.

The HPMS database is unique because it directly ties together roadway physical, operational, usage (travel), condition, and performance data that can be analyzed and summarized at sub-state, statewide, and national levels by highway system. A newly added Geographic Information System (GIS) capability will greatly enhance the users' ability to analyze and display HPMS data.

How Does Florida Collect HPMS Data?

In the State of Florida, the State Materials Office of the Florida Department of Transportation (FDOT) collects the required ride data on selected sections of the State Highway System on an annual basis. The State Materials Office began collecting ride data for the HPMS, in conjunction with its Pavement Condition Survey (PCS) program, in 1991. Prior to the 1994/1995 survey, Florida reported the data collected on sample sections only. Thereafter, however, the Department was required to report the ride values in one direction for both flexible and rigid roadways from the Pavement Management System (PMS) database. The flexible and rigid pavement sections were in addition to the HPMS sample sections. For PMS purposes, the State Materials Office collects ride values in both directions for divided roadways and in one direction for composite roadways on the entire State maintained roadway system.

Currently, FHWA requires collecting HPMS ride data, in one direction only, on the entire State Highway System (referred to as "*Designated Sections*"). These Sections follow the same section lengths and limits as the PCS sections. At times, the *Designated Sections* may not be all rated for different reasons (such as being under reconstruction, part of ongoing construction projects, or other causes). In such an instance, the sections among the *Designated Sections* that were rated are labeled (or referred to) as "*Rated Sections*". Furthermore, FHWA also requires the collection of ride data on specific locations (that could be in either direction) that, in most cases, do not coincide with any PCS section. These sections are known as "*Sample Sections*" and are identified by number, county section number, beginning milepost and ending milepost.

Prior to the 1998/99 survey, the data was collected using ultrasonic sensors and the ride values were reported in terms of International Roughness Index (IRI), without any filtering. Thereafter, the Department implemented the use of laser sensors for ride data collection. The ride values are still reported as International Roughness Index but filtered to a 300-foot wavelength (IRI_{F300}). IRI is rigorously defined as a specific mathematical transform (and, thus, a property) of a true profile. The calculation of IRI takes into consideration wavelengths between 4 and 100 feet. It is believed that wavelengths outside this band do not contribute to the roughness felt in vehicles at speeds near 50 mph (testing speed). IRI values are reported in compliance with the FHWA Appendix E of the *Highway Performance Monitoring System Field Manual* dated December 2000 with the following exceptions: 1) Florida reports IRI values from the right wheel path. 2) IRI values are reported in English units. 3) IRI values are calculated with longitudinal spacing of 12 inches (310mm).

In January of 2000, the State Materials Office started the collection of ride data, in terms of IRI, also for the HPMS off system sections. The data collection process in this case is similar to that of other HPMS sections. The data collection itself, however, is conducted during the time period between annual PCS surveys.

The data collected between 1991 and 1996, in compliance with FHWA requirements, included bridges, railroad crossings, etc. But in accordance with the present requirements, the current data collection omits bridges, railroad crossings, etc.

High Speed Profilers (5) used to collect PMS and HPMS data are calibrated per manufacturer's recommendations every 30 days. Profilers are also calibrated every 30 days on field sections exhibiting a range of roughness established with a dipstick annually.

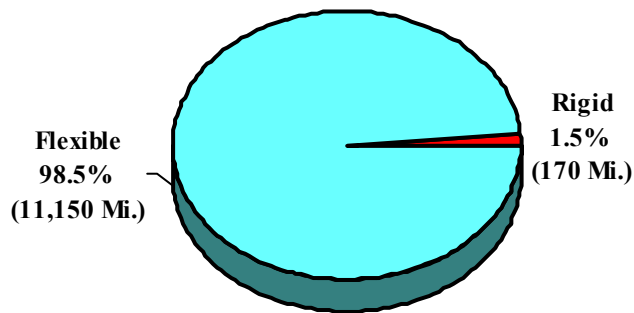
How Does Data Collection Procedures Affect HPMS Data?

Although standards specifying the HPMS data collection and reporting process do exist (Appendix E), their interpretation/implementation may not always be the same among the state highway agencies. For instance, in order to determine IRI values, the profile data may be averaged differently (moving average, straight average, etc.). The profile data may also be filtered differently (no filtering, 300-foot wavelength, etc.). In addition, the profile data may be collected using various sensor types (ultrasonic, laser, optical, or infrared sensors) while the sensors may also be spaced differently on the test vehicle (transverse locations). Moreover, some states report HPMS data from that collected as part of their Pavement Management System, rather than the specific HPMS sample sections. Consequently, it may not be realistic or appropriate to compare data between states.

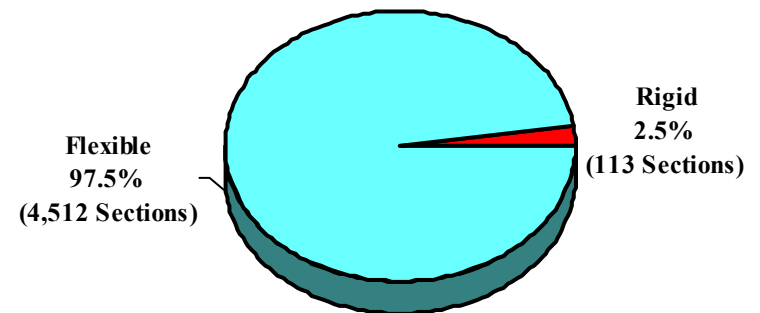
The present report provides essential information on the current ride quality of the Florida roadway system. It also includes a summary of the historical ride data.

2002 HPMS Sections Statewide

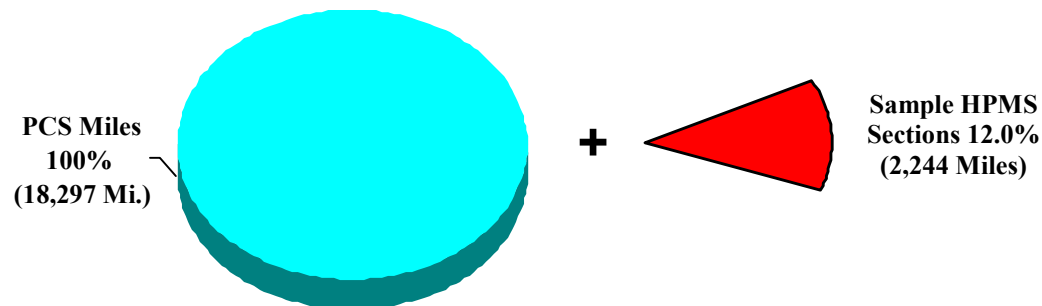
**HPMS Rated Miles: 11,320 Mi.
(One Direction from PCS)**



**Number of HPMS Sections: 4,625
(One Direction from PCS)**

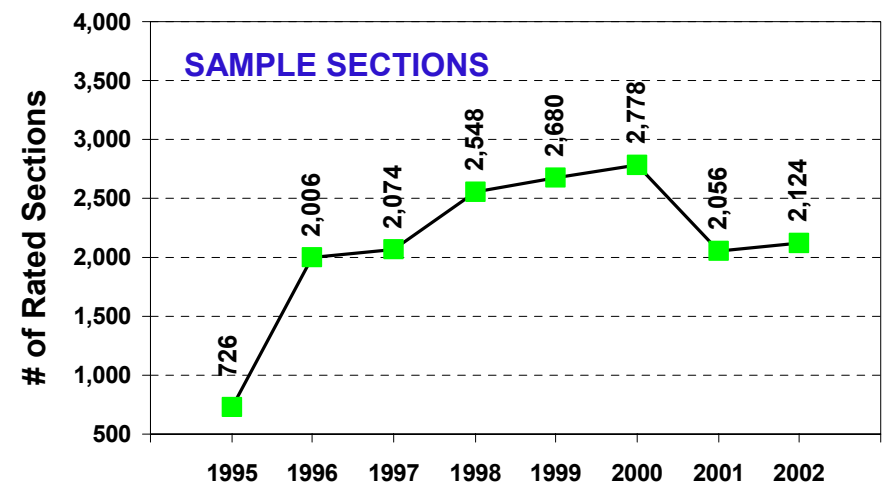
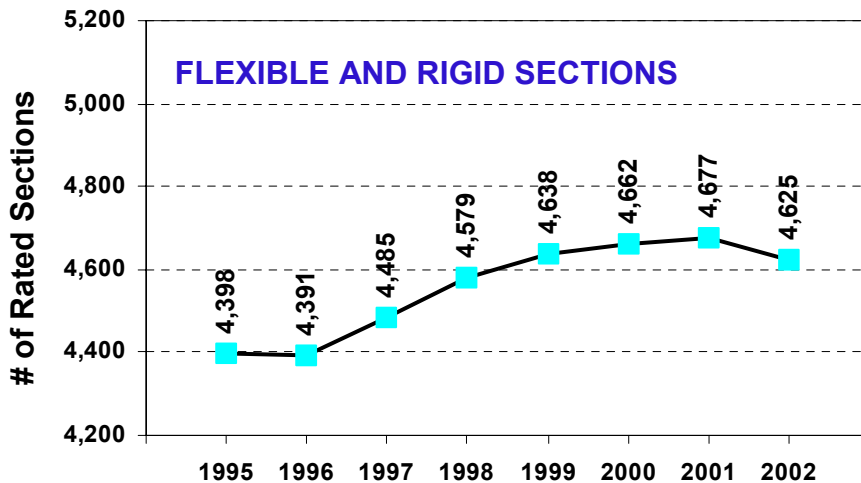
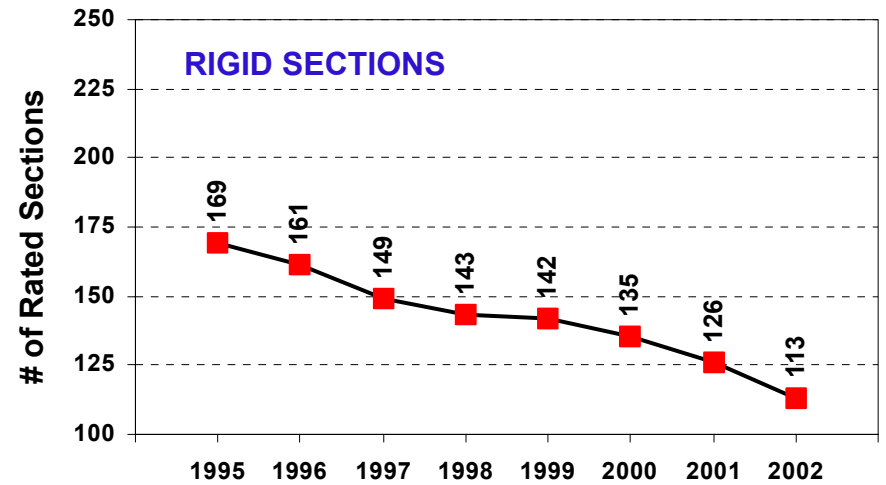
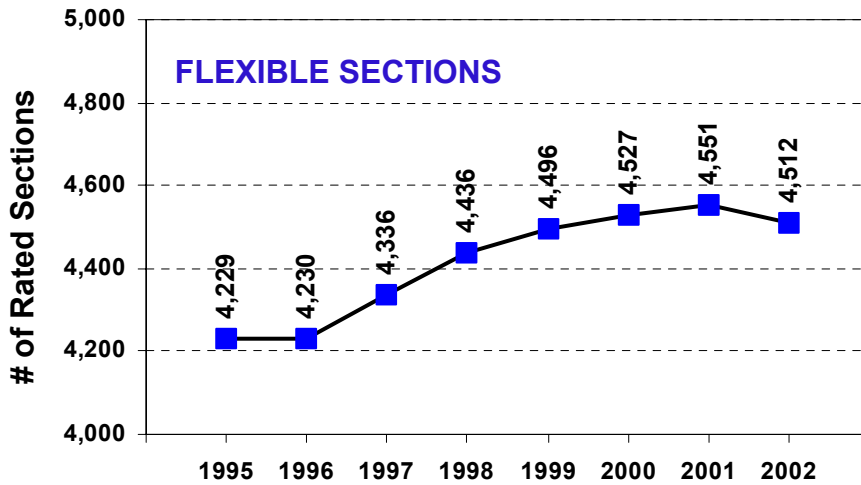


**Total PCS Rated Miles 18,297
(Both Directions)**

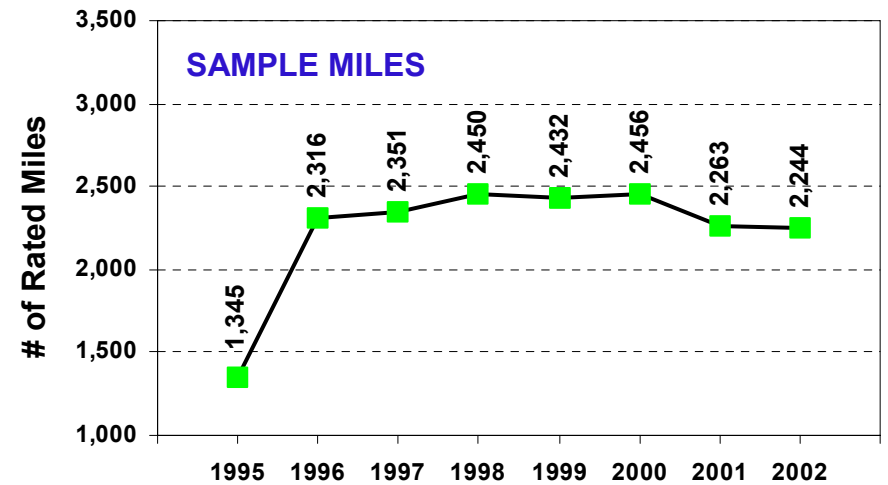
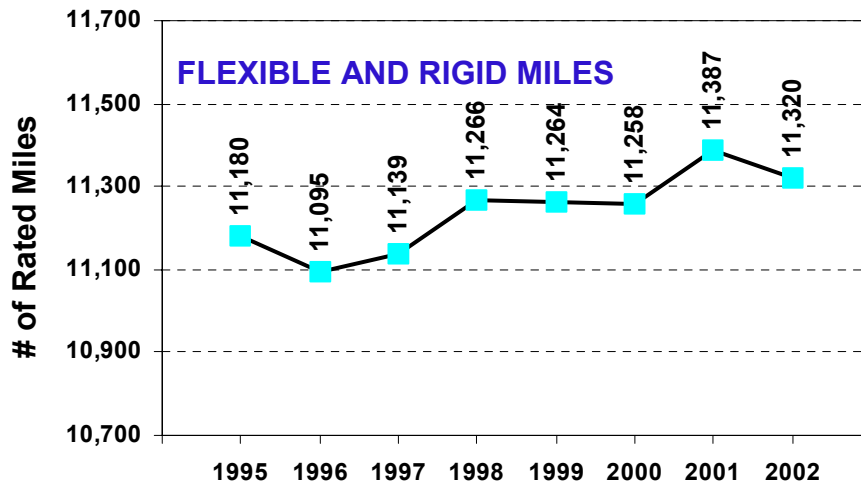
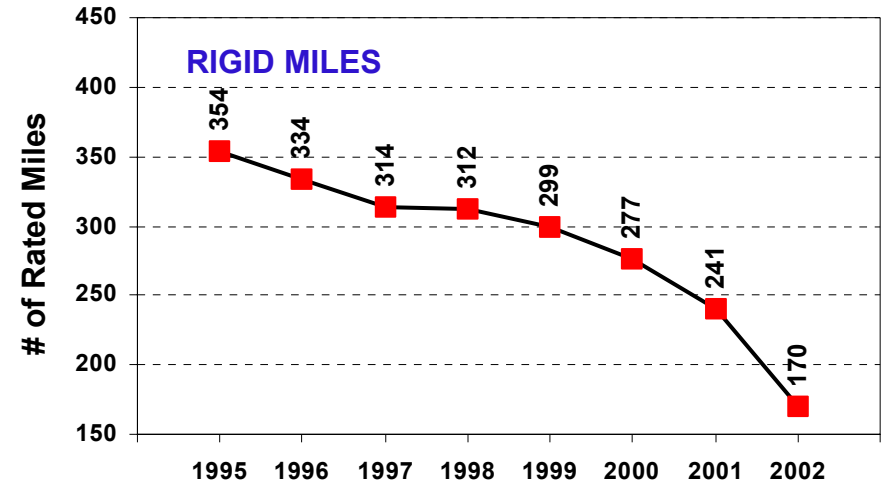
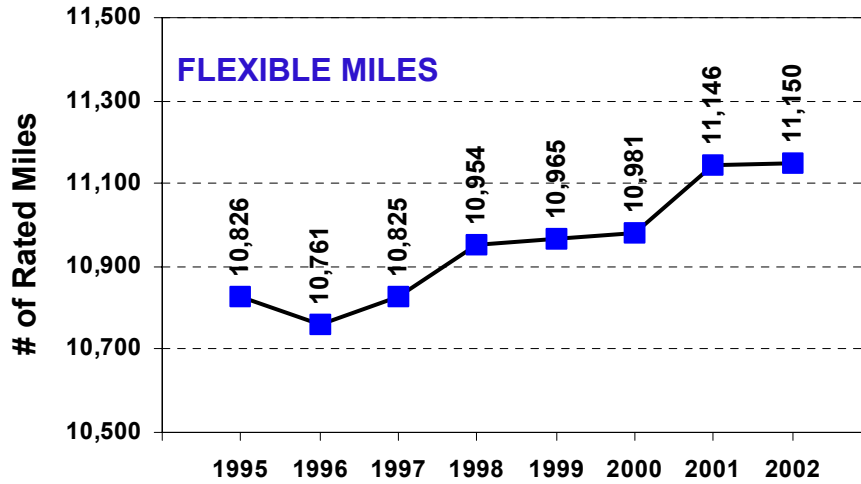


**Sample HPMS
Sections are
extracted from PCS
data and reported to
FHWA**

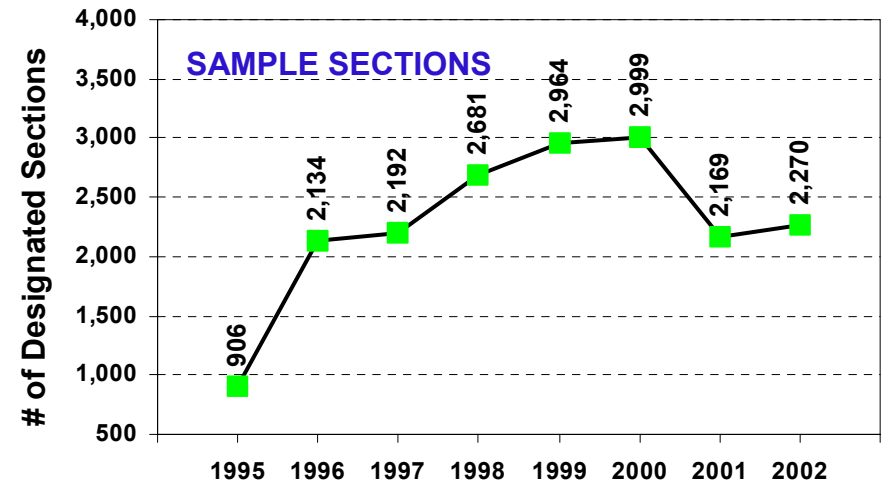
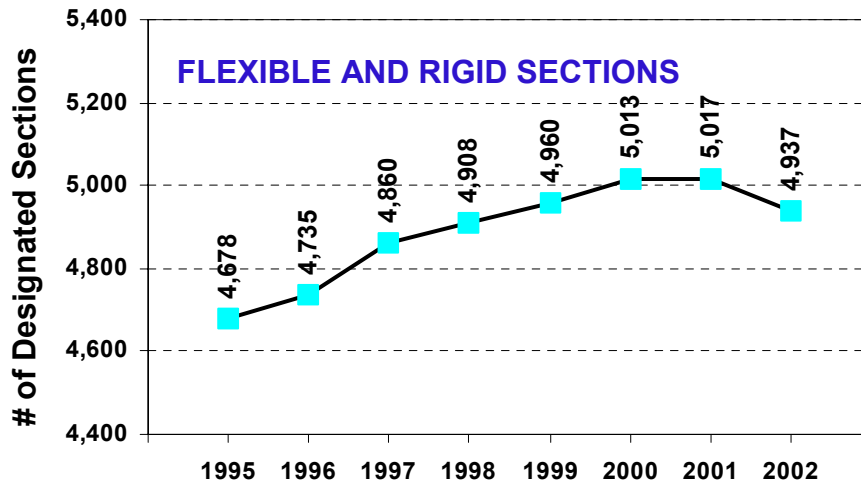
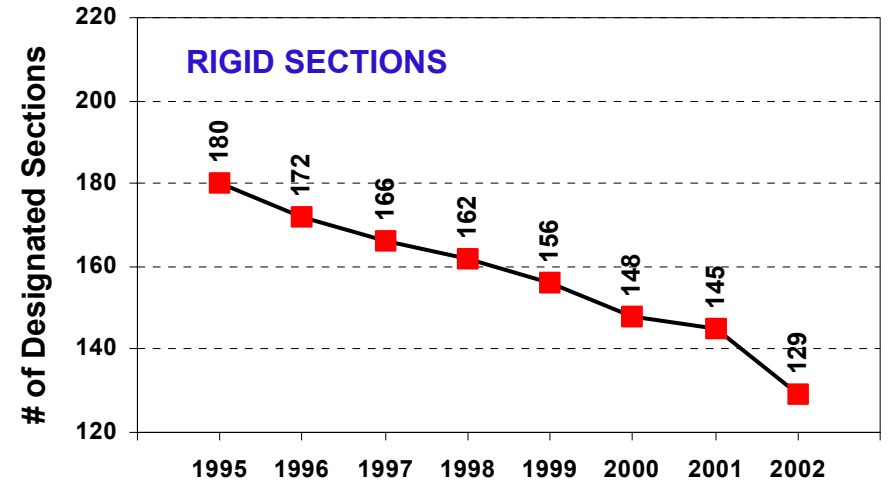
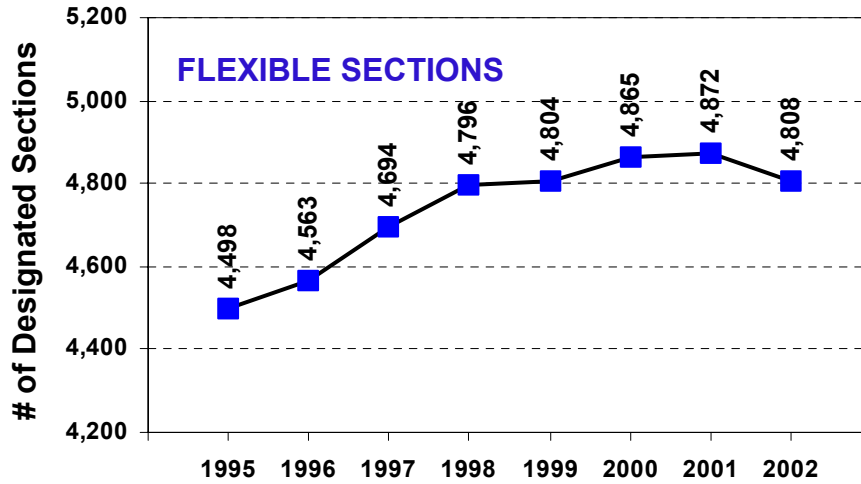
Number of HPMS Rated Sections



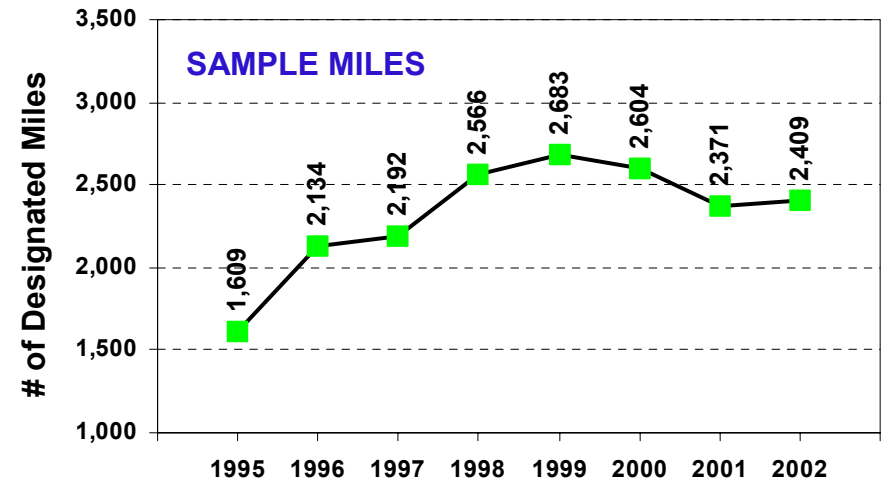
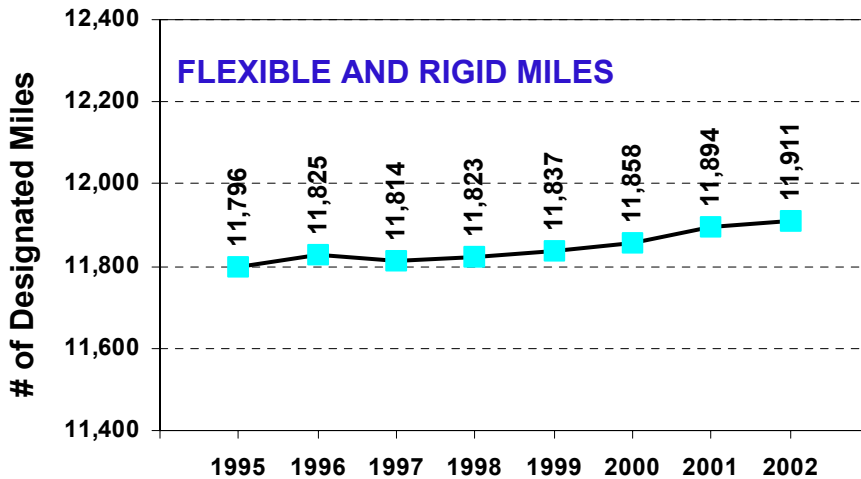
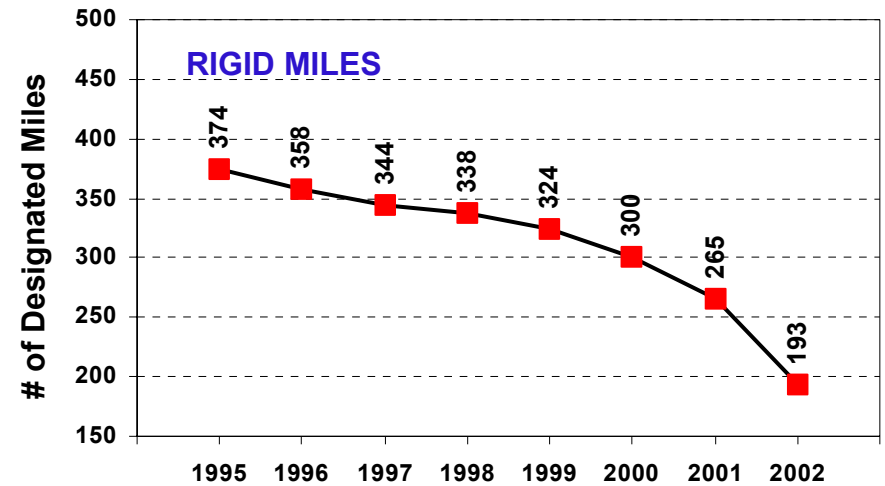
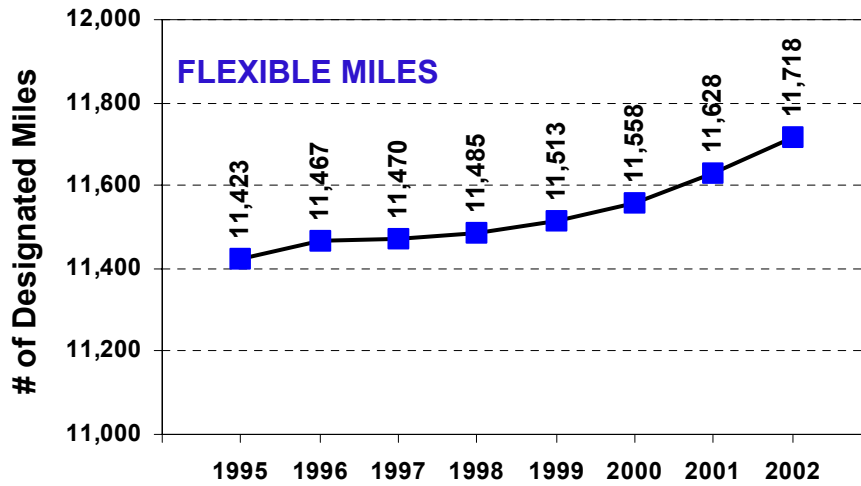
Number of HPMS Rated Miles



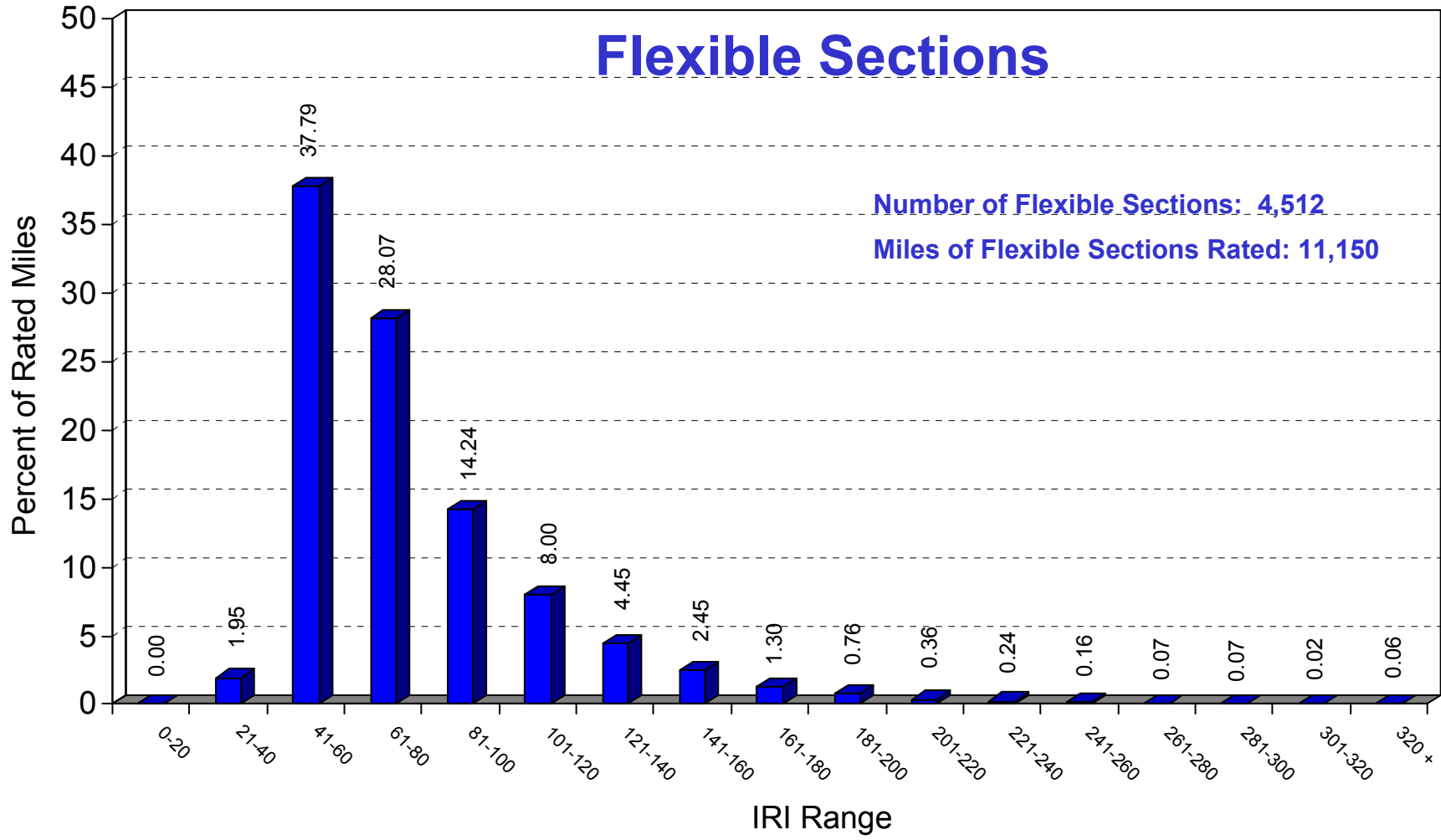
Number of HPMS Designated Sections



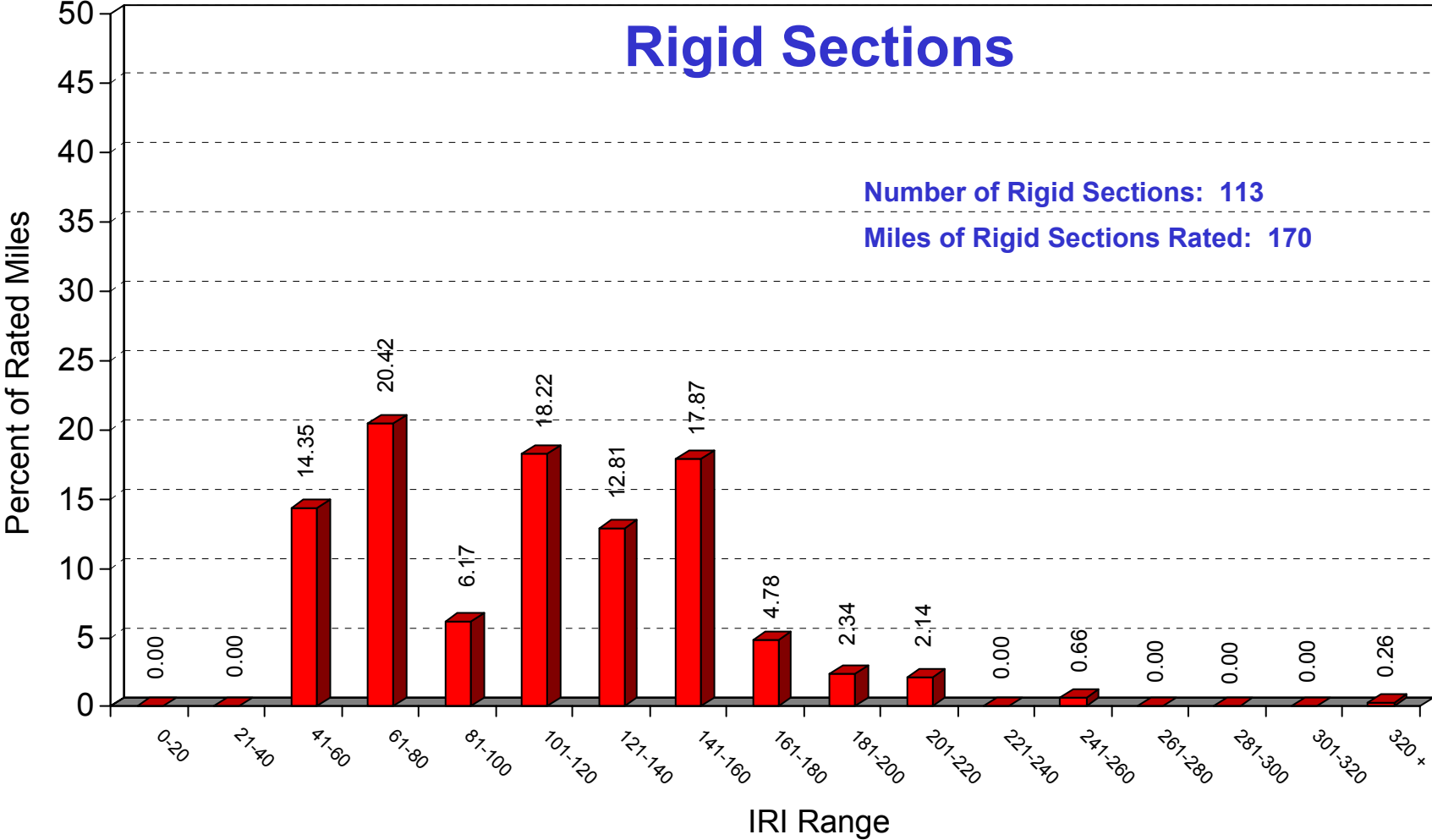
Number of HPMS Designated Miles



2002 Frequency Distribution of IRI Statewide



2002 Frequency Distribution of IRI Statewide

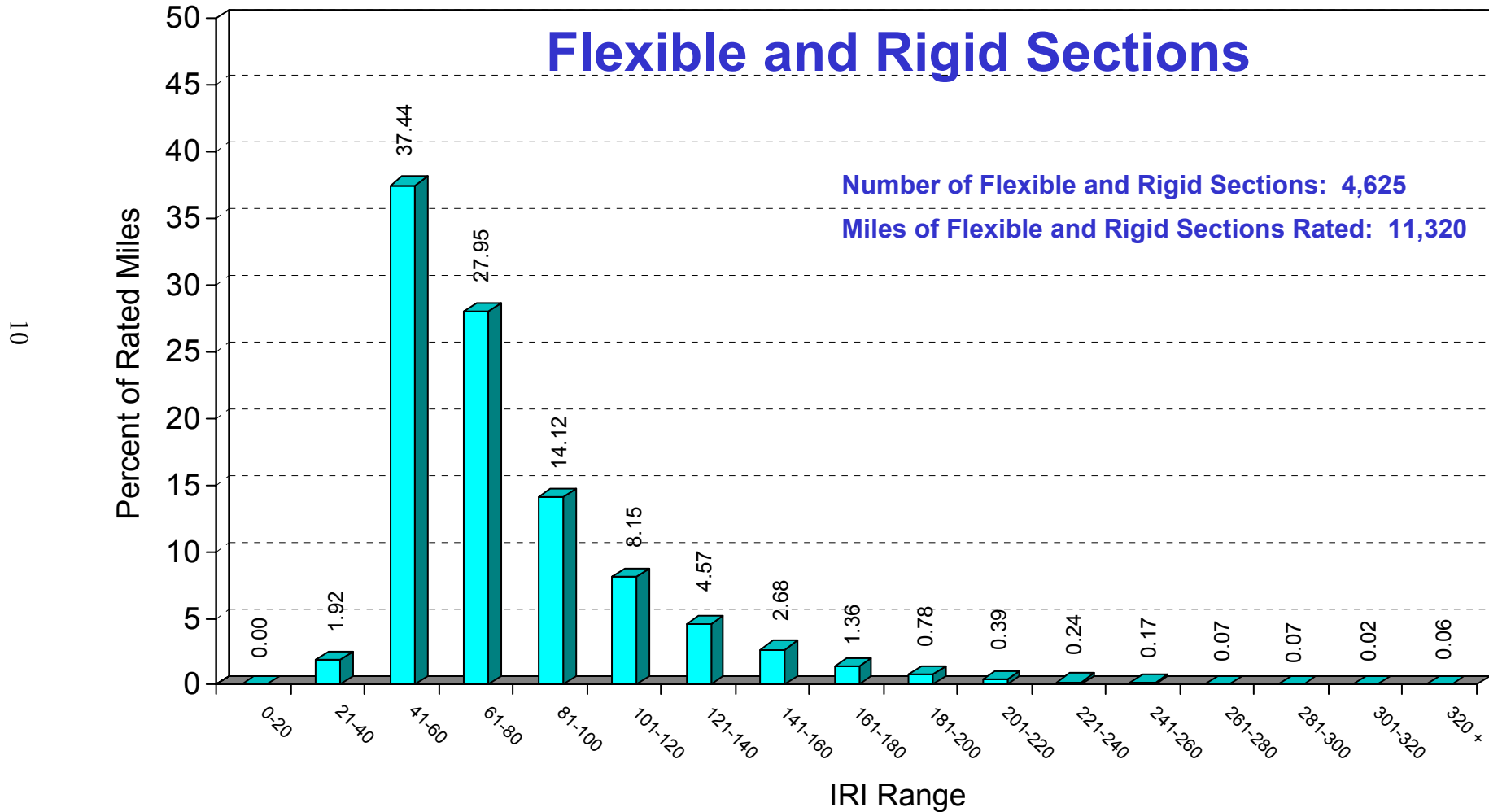


2002 Frequency Distribution of IRI Statewide

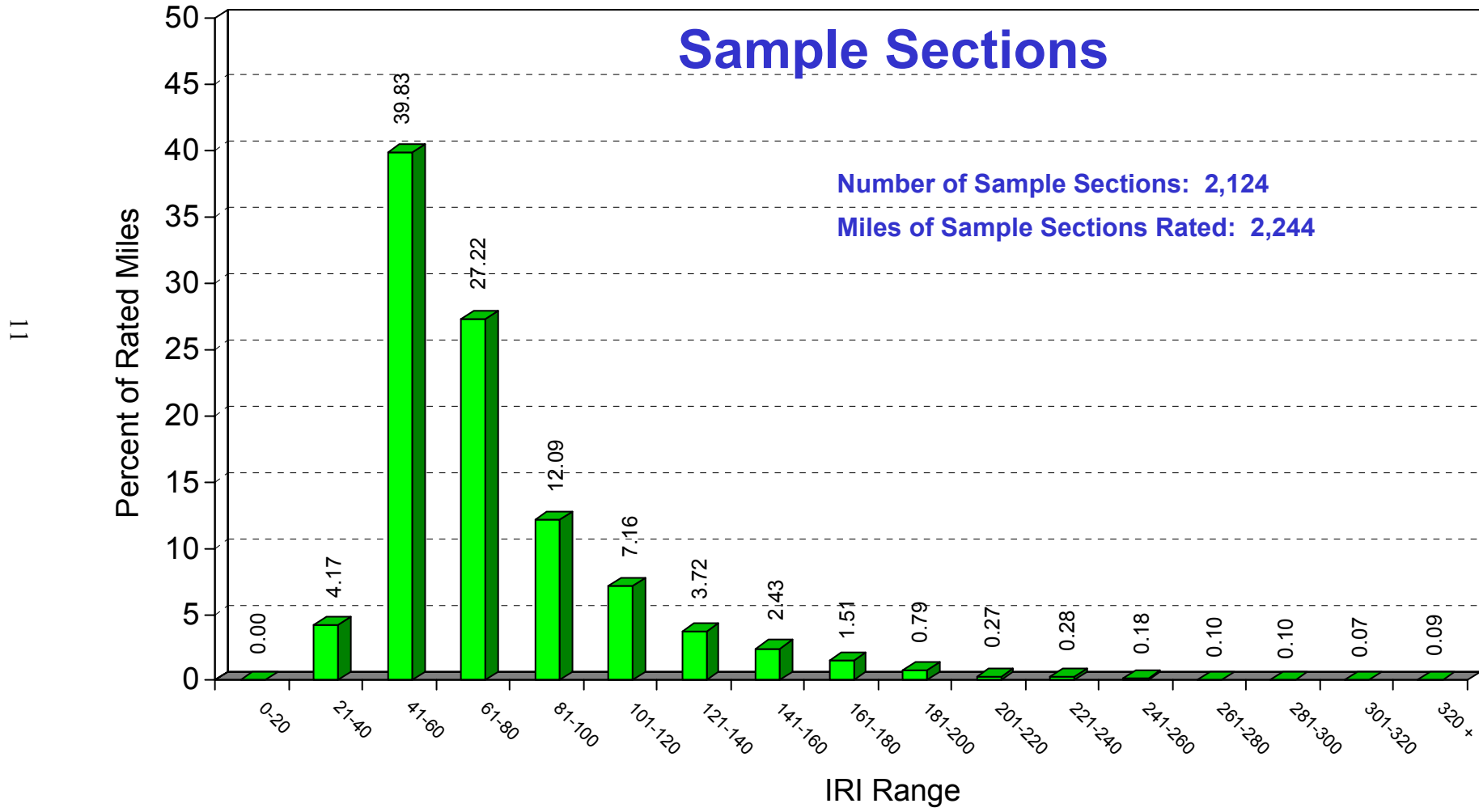
Flexible and Rigid Sections

Number of Flexible and Rigid Sections: 4,625

Miles of Flexible and Rigid Sections Rated: 11,320



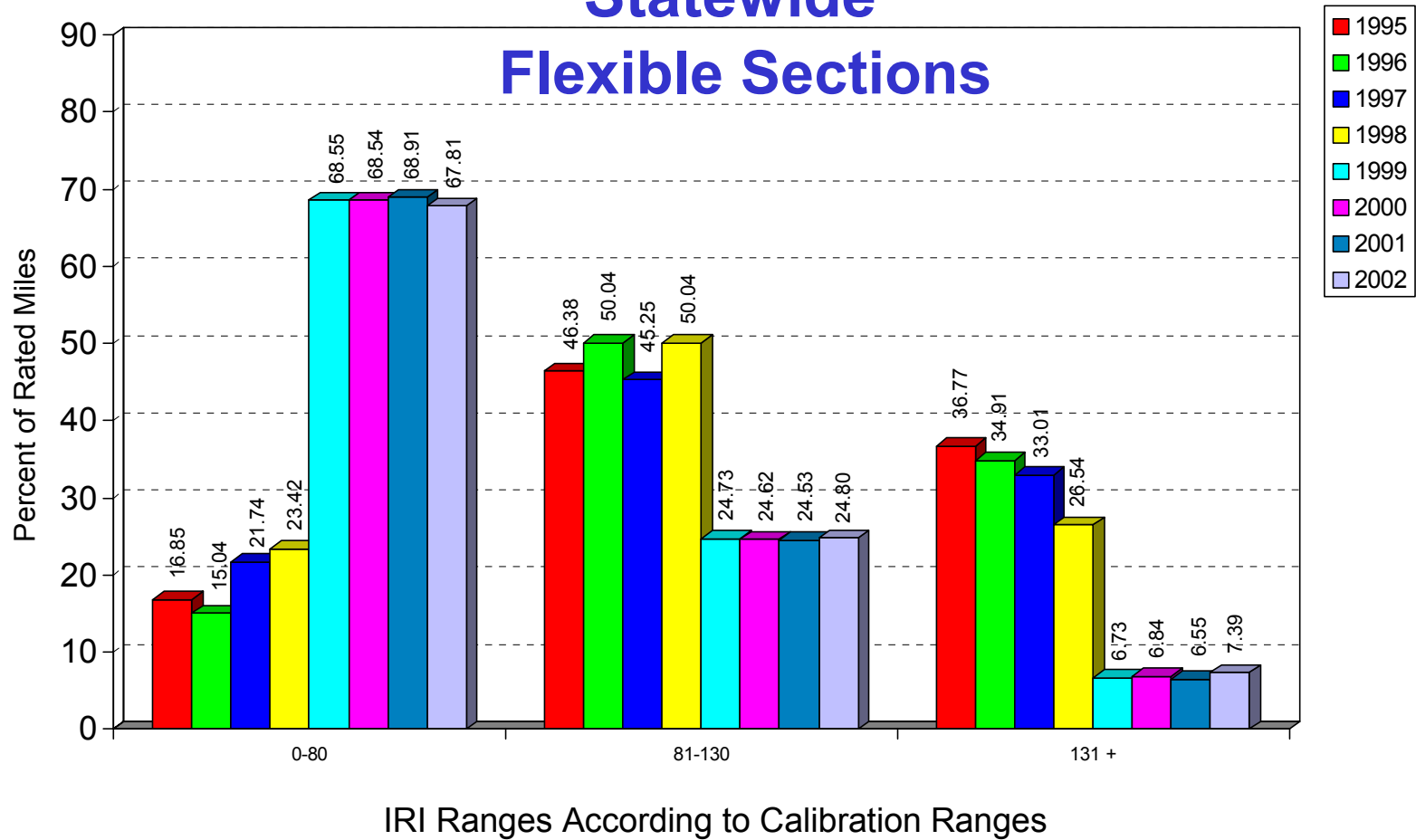
2002 Frequency Distribution of IRI Statewide



Percent of Rated Miles within IRI Ranges from 1995 – 2002

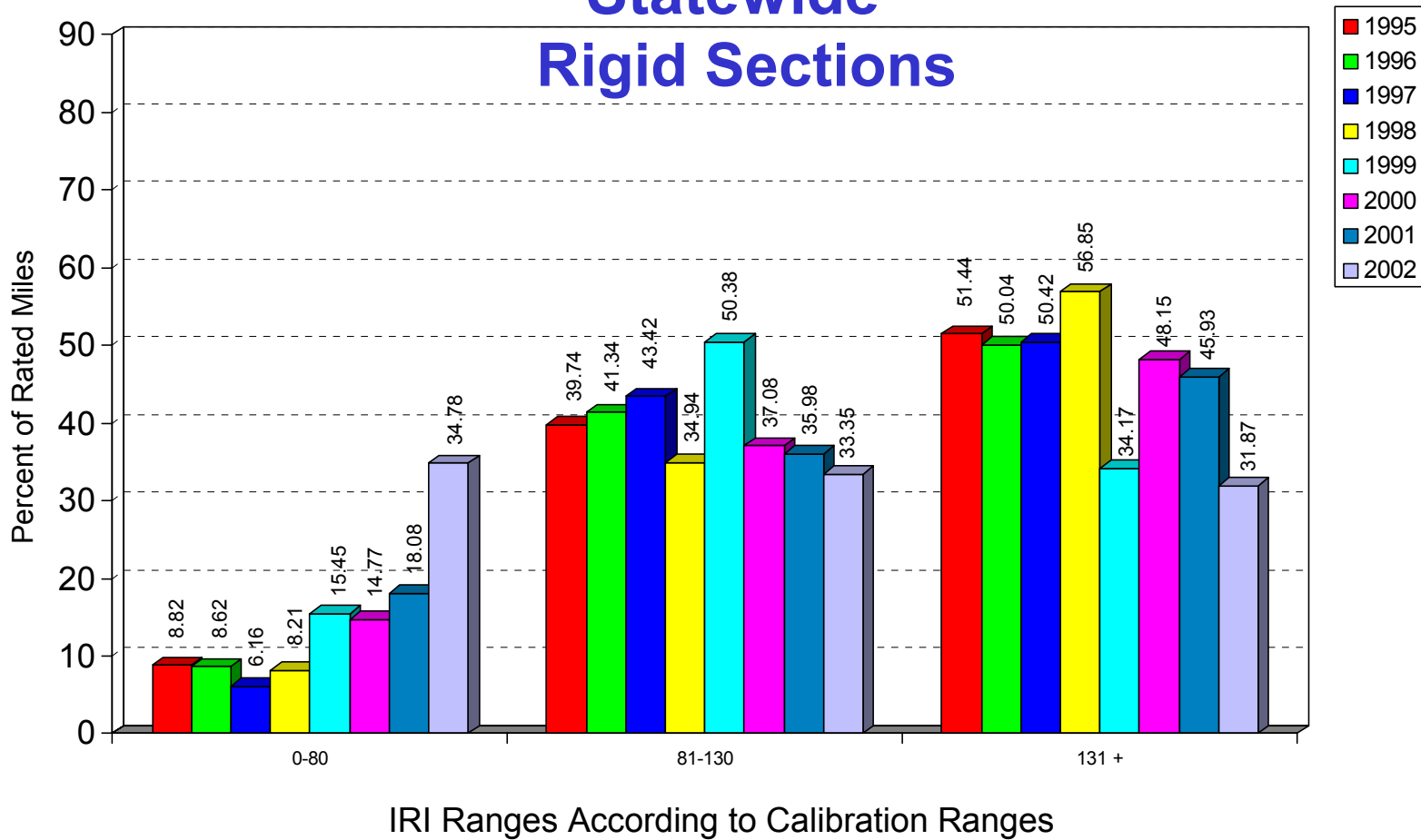
Statewide

Flexible Sections



Percent of Rated Miles within IRI Ranges from 1995 – 2002

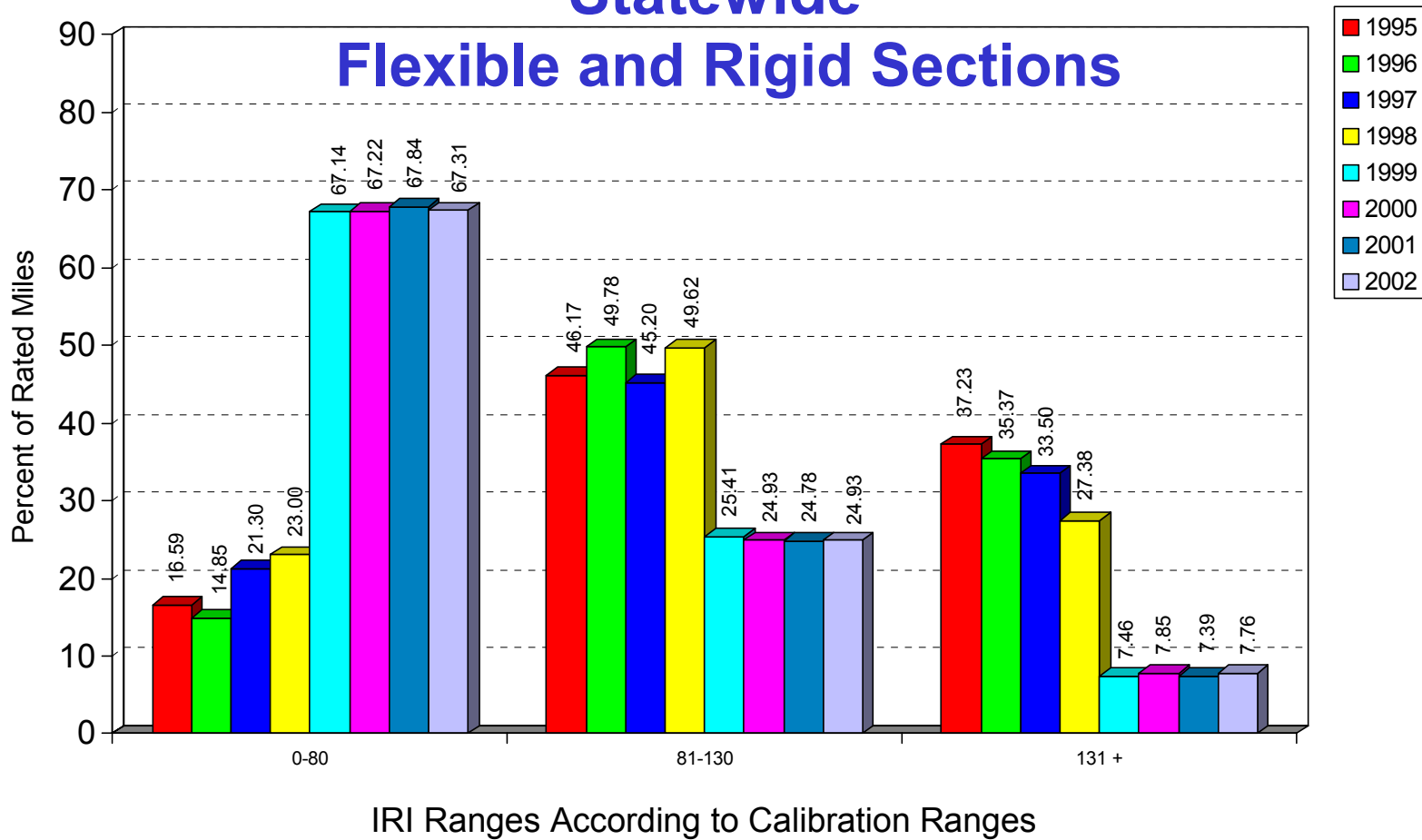
Statewide Rigid Sections



Percent of Rated Miles within IRI Ranges from 1995 – 2002

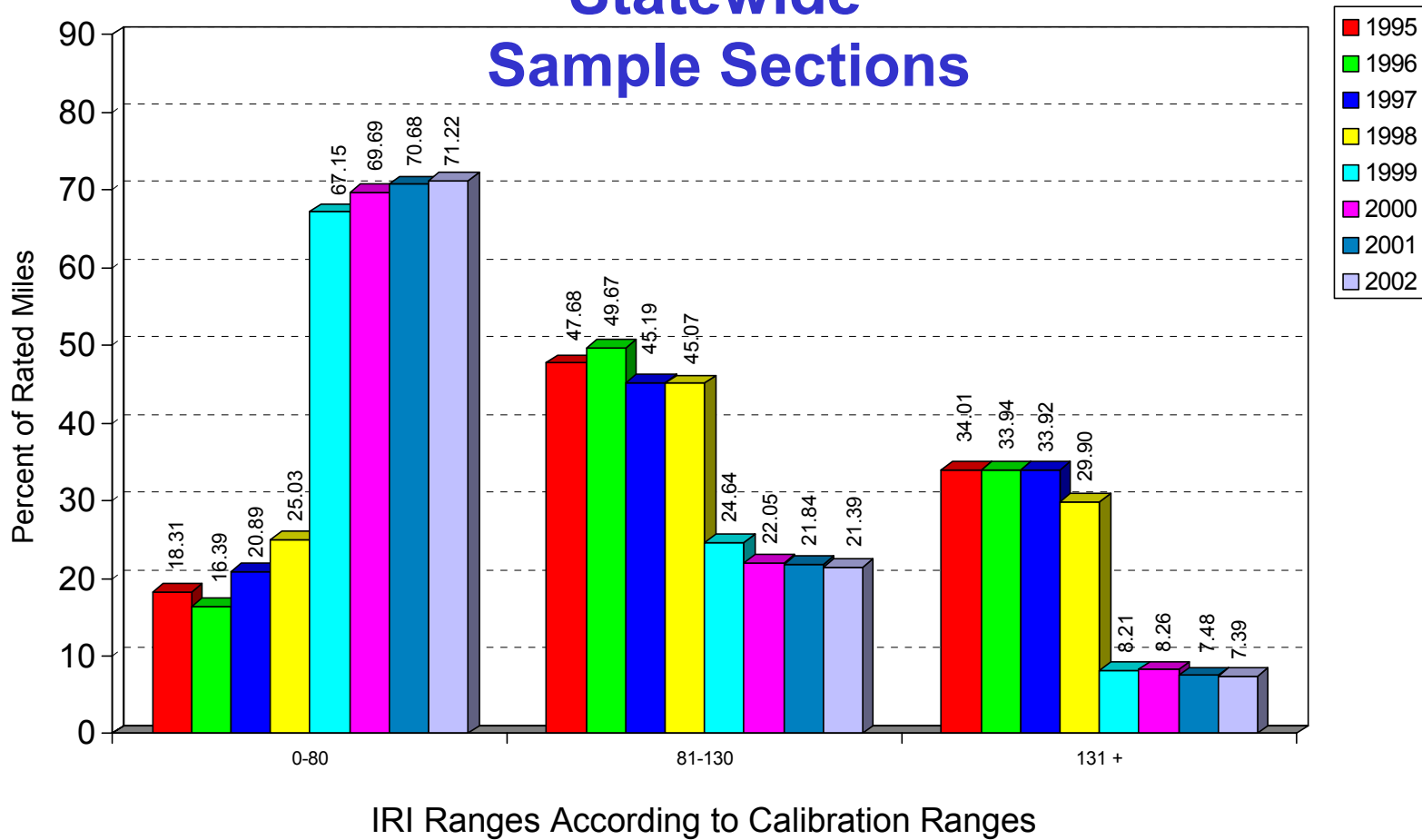
Statewide

Flexible and Rigid Sections

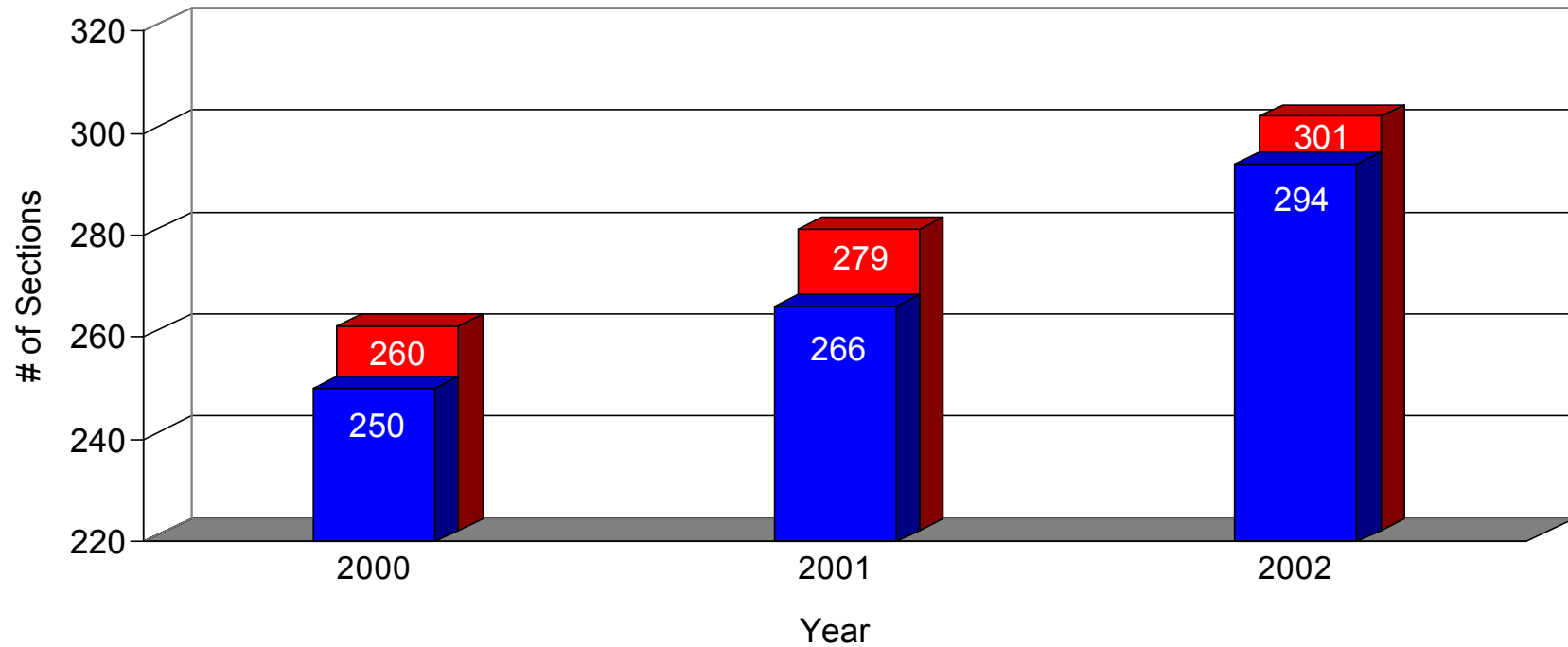


Percent of Rated Miles within IRI Ranges from 1995 – 2002

Statewide Sample Sections



HPMS Off-System Rated and Designated Sections



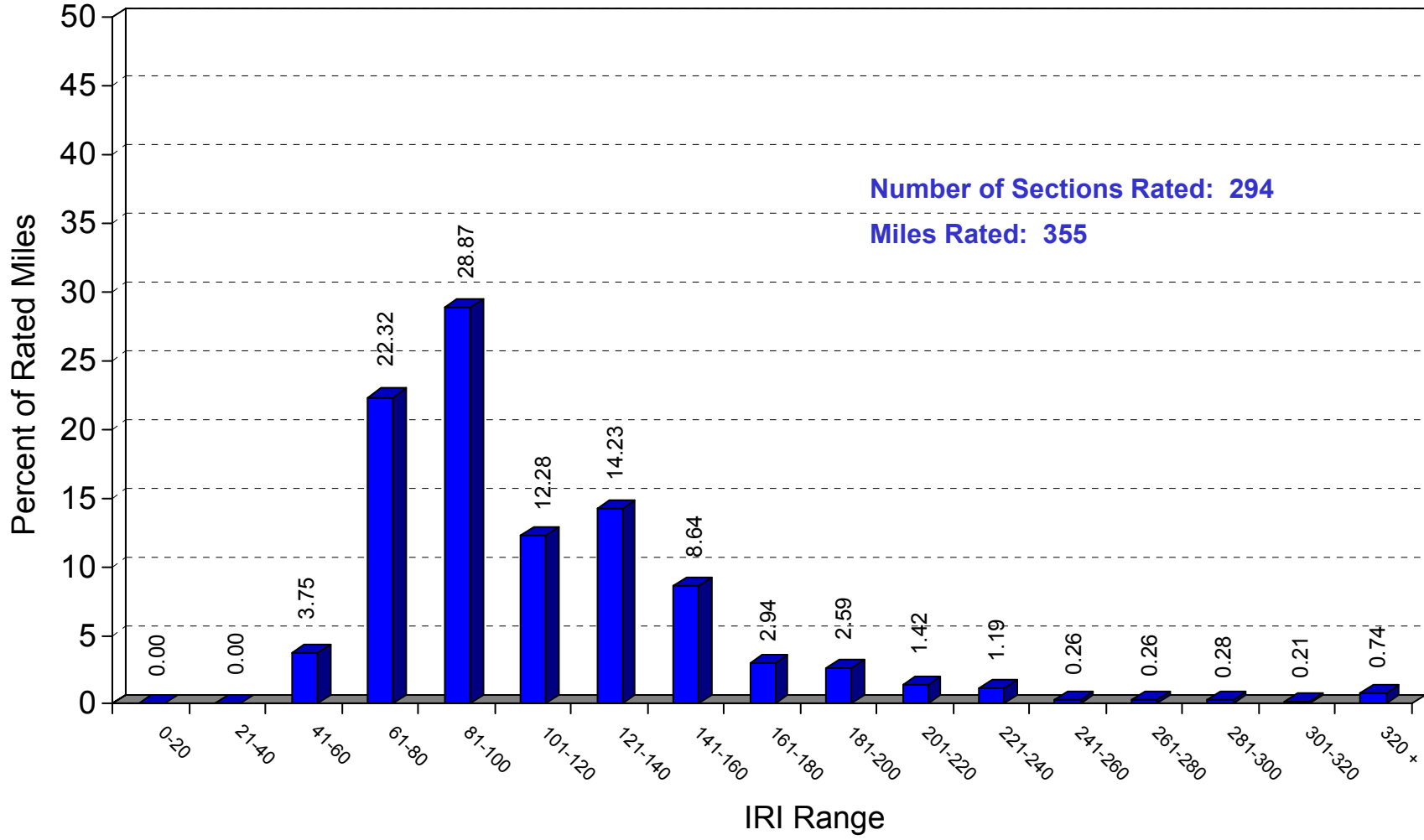
■ Rated Sections ■ Designated Sections

HPMS Off-System Rated and Designated Miles



2002 Frequency Distribution of IRI

Off-System HPMS



Percent of Rated Miles within IRI Ranges from 2000 – 2002

Off-System HPMS

