

STATE OF FLORIDA



**2003
HIGHWAY PERFORMANCE
MONITORING SYSTEM
FACTS & FIGURES**

**FL/DOT/SMO/03-460
April 2003**

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 the data on the physical, operational, usage (travel), condition, and performance of the roadway 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?

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 1991, in conjunction with its Pavement Condition Survey (PCS) program. Prior to the 1994/1995 survey, Florida reported the data collected on sample sections only. Thereafter, 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, 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 Highway System.

Currently, FHWA requires collecting HPMS ride data, in one direction only, on the entire State Highway System. These Sections, referred to as "*Designated Sections*," follow the same section lengths and limits as the PCS sections. At times, a *Designated Section* may not be rated for a number of reasons (e.g. section is under reconstruction, part of on-going construction projects, or other reasons). Such sections are referred to as "*Rated Sections*." FHWA further requires the collection of ride data on specific locations (that could be in either direction) which, in most cases, do not coincide with any PCS section. These sections are known as "*Sample Sections*" and are identified by an HPMS ID number, county section number, beginning and ending mileposts.

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) in inches/mile, without any filtering. Thereafter, the Department implemented the use of laser sensors for ride data collection. The ride values are still reported as IRI but filtered to a 300-foot wavelength (IRI_{F300}). IRI is rigorously defined as a specific mathematical transform, or 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. IRI values are reported in compliance with the FHWA Appendix E of the *Highway Performance Monitoring System Field Manual*, dated May 2003.

In January of 2000, the State Materials Office started collecting HPMS off system sections ride data, in terms of IRI. The data collection process in this case is similar to that of HPMS sections and is conducted between annual PCS surveys.

The data collected between 1991 and 1996, in compliance with previous FHWA requirements, included bridges, railroad crossings, etc. But these structures are omitted from the database in accordance with Appendix E of the May 2003 HPMS Field Manual.

The five (5) High Speed Profilers used by the FDOT are calibrated in accordance with the manufacturer's recommendations. These profilers are also calibrated every 30 days on field sections exhibiting a range of roughness established with a dipstick annually.

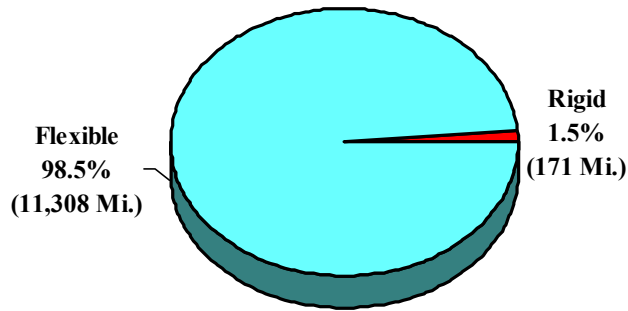
How Does Data Collection Procedures Affect HPMS Data?

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) and different sensor spacing (63 to 71 inches) (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.

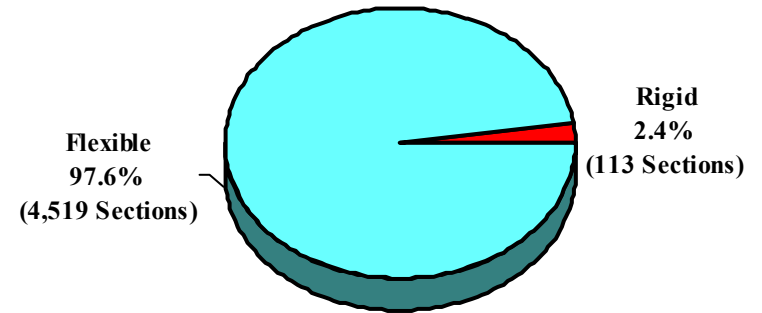
The present report provides essential information on the current ride quality of the Florida roadway system. It also includes a summary of the historical ride data.

2003 HPMS Sections

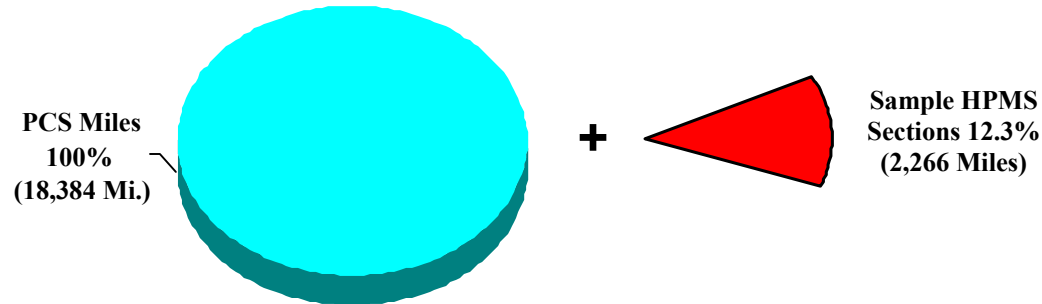
**HPMS Rated Miles: 11,479 Mi.
(One Direction from PCS)**



**HPMS Rated Sections: 4,632
(One Direction from PCS)**

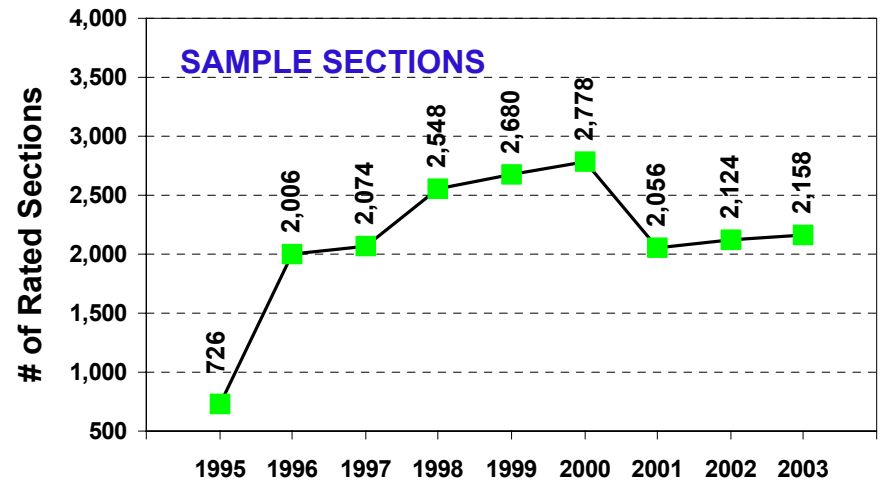
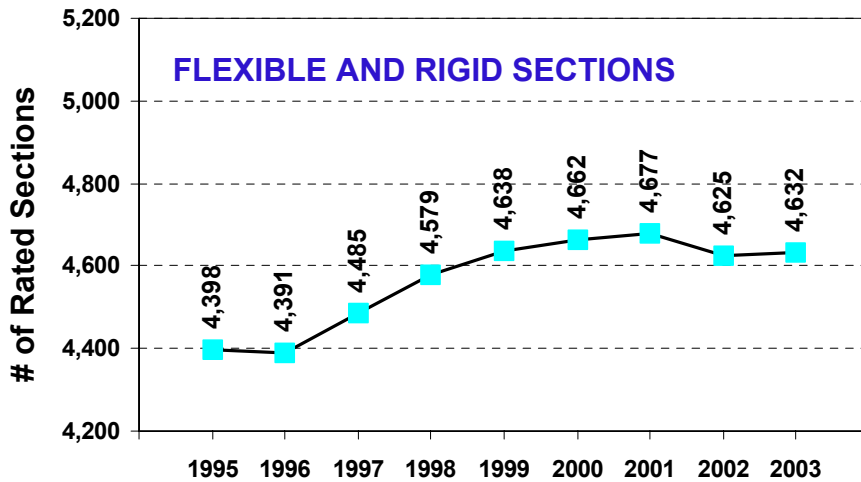
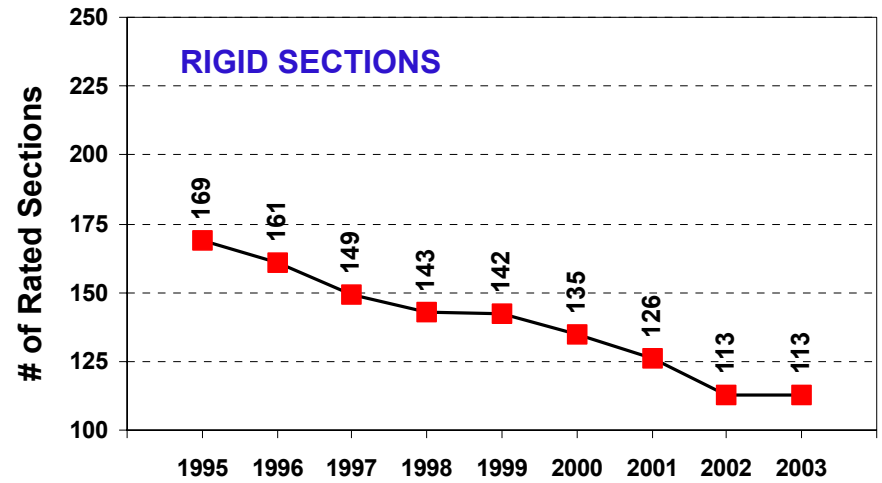
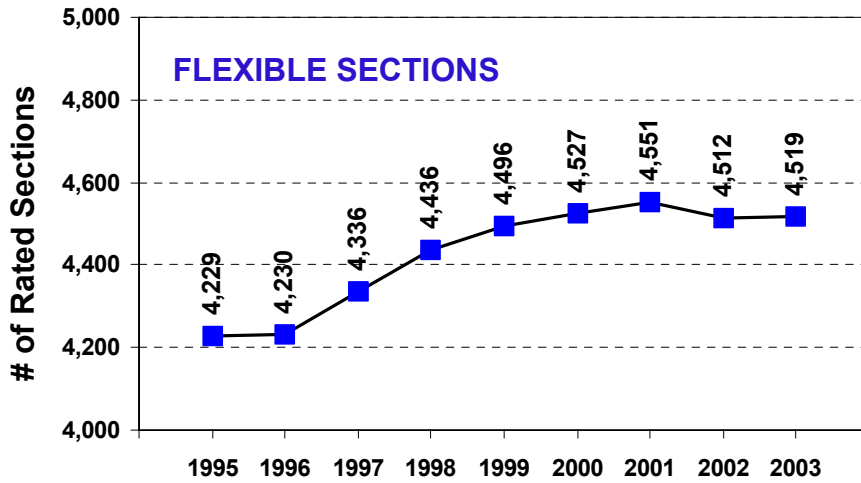


**Total PCS Rated Miles 18,384
(Both Directions)**

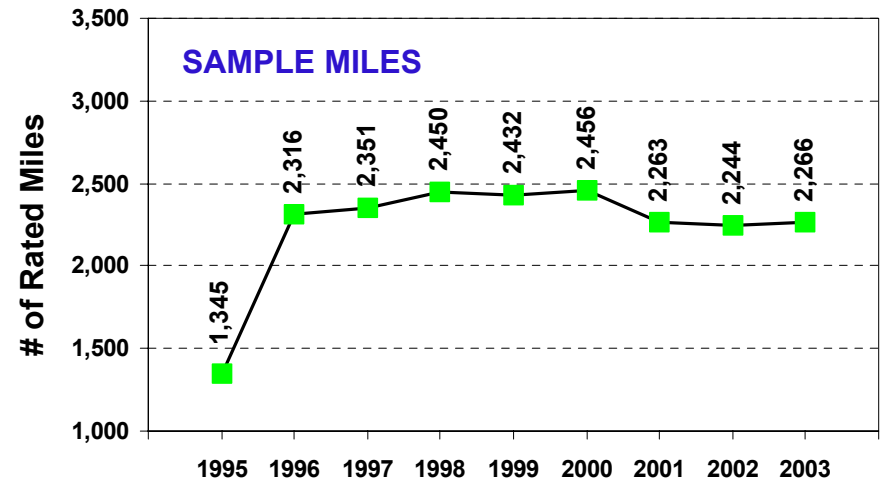
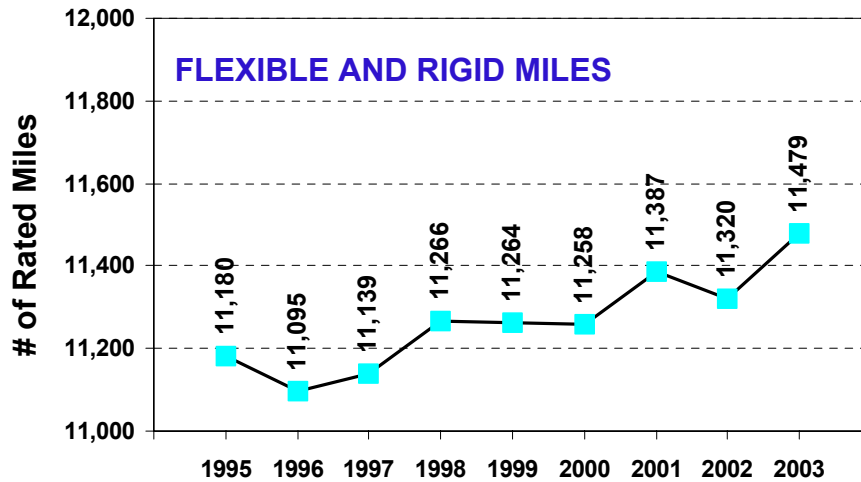
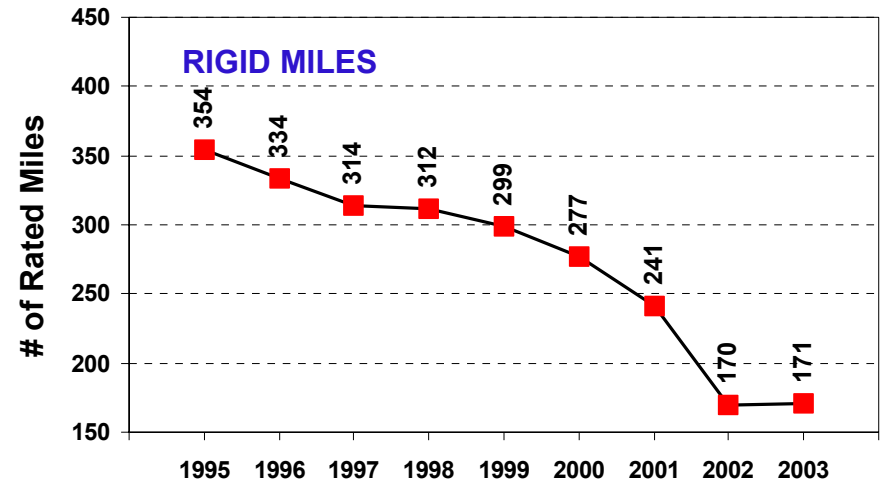
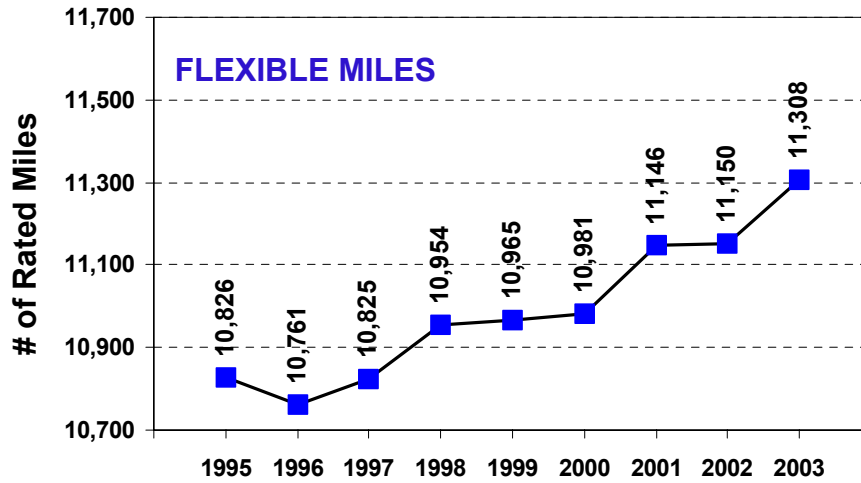


**Sample HPMS
Sections are
extracted from PCS
data and reported to
FHWA**

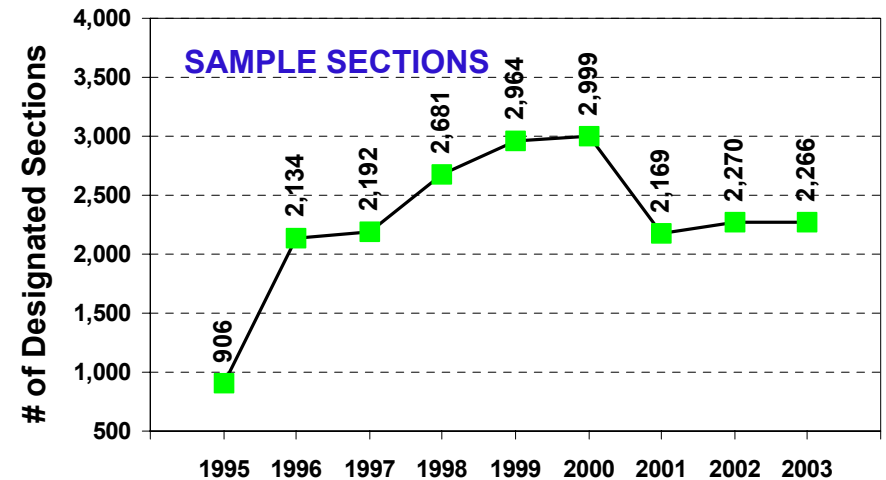
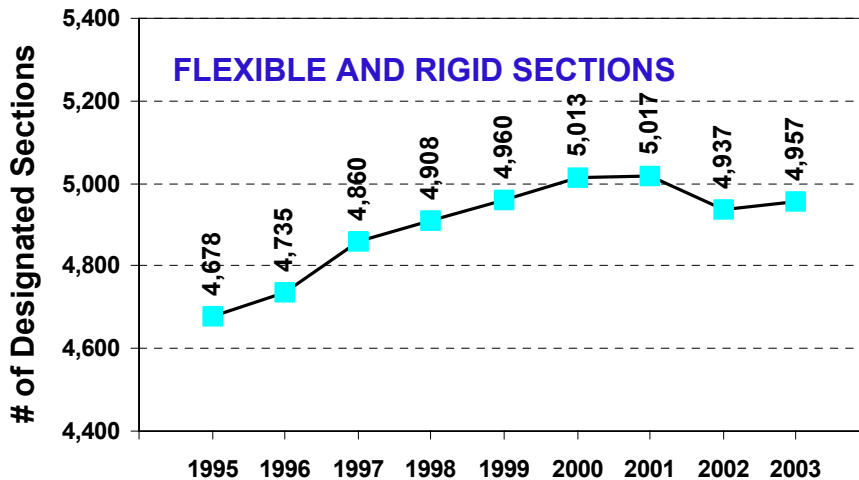
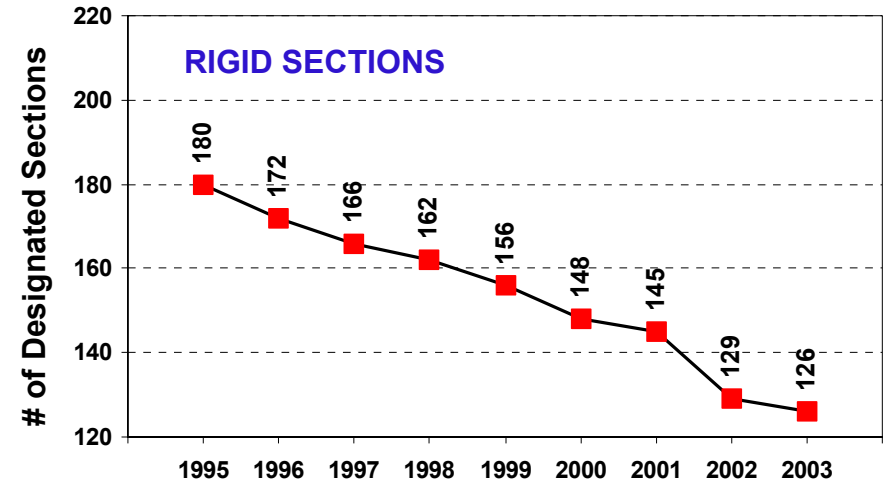
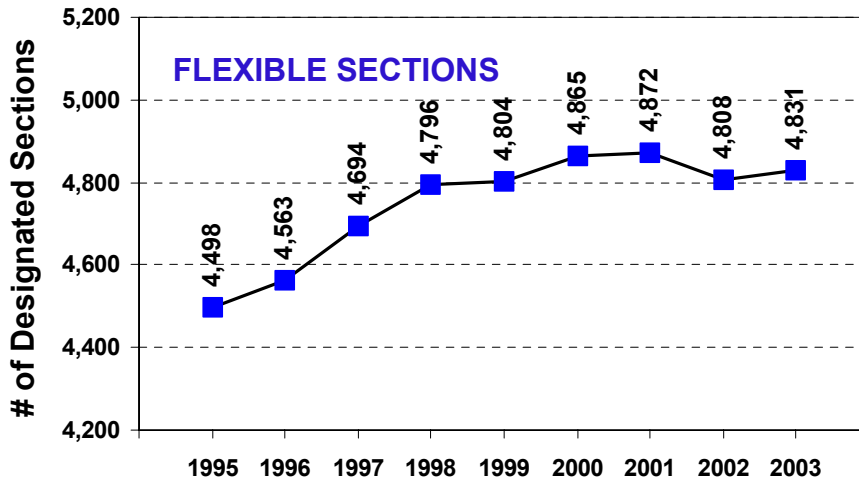
Annual HPMS Rated Sections



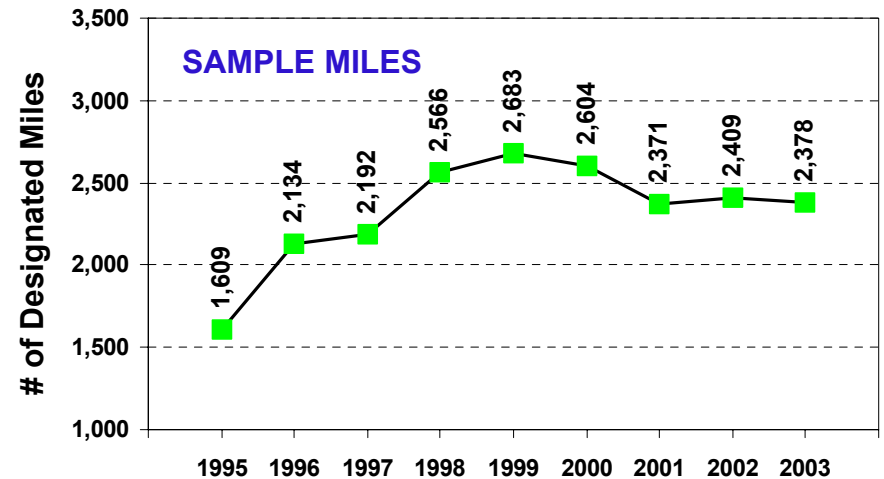
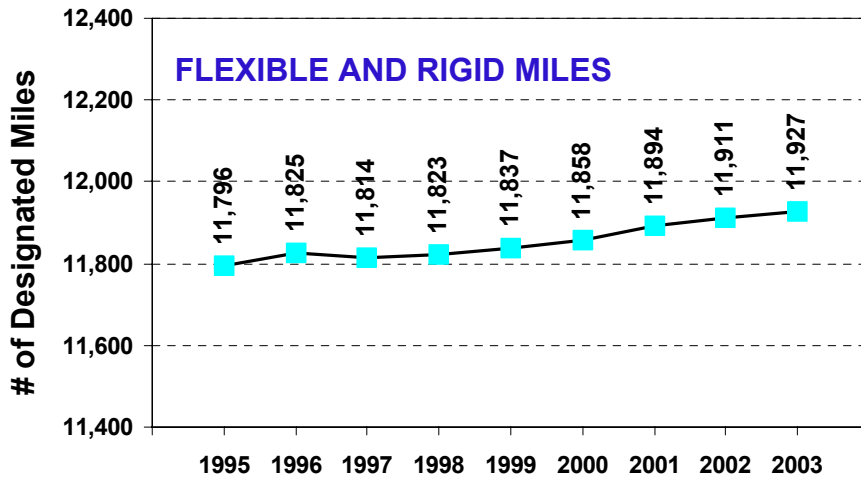
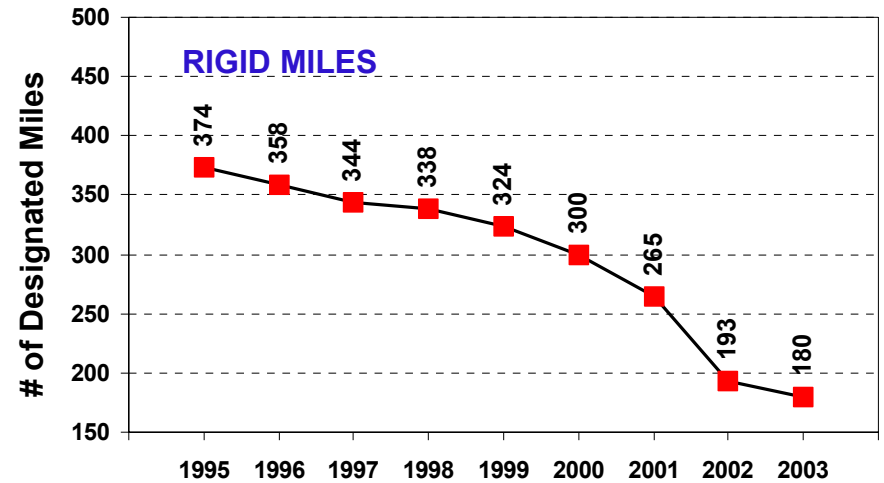
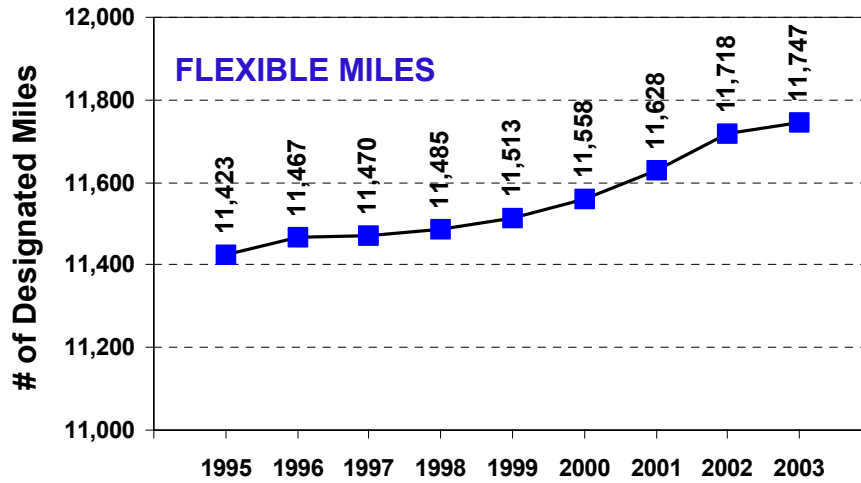
Annual HPMS Rated Miles



Annual HPMS Designated Sections

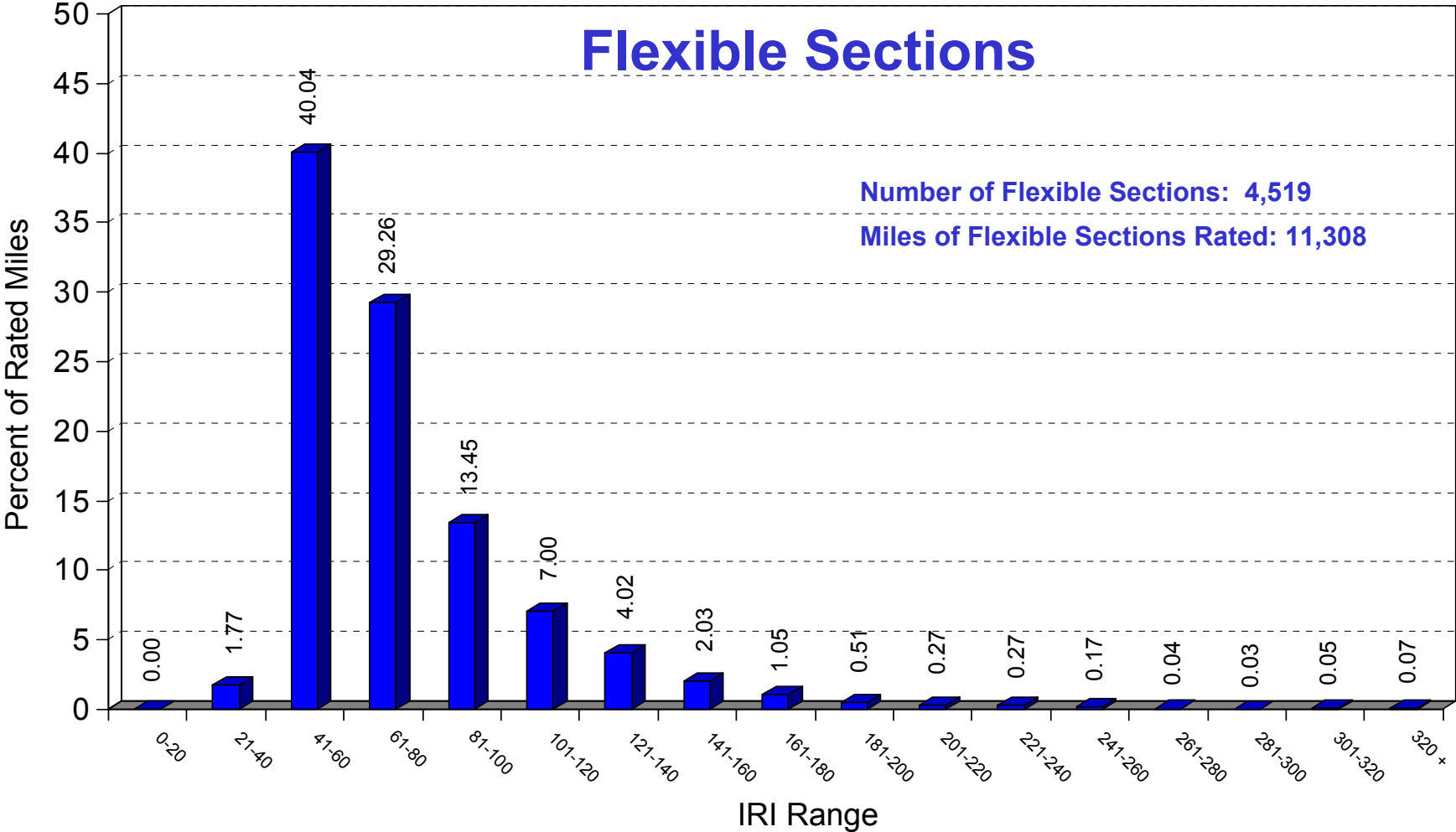


Annual HPMS Designated Miles

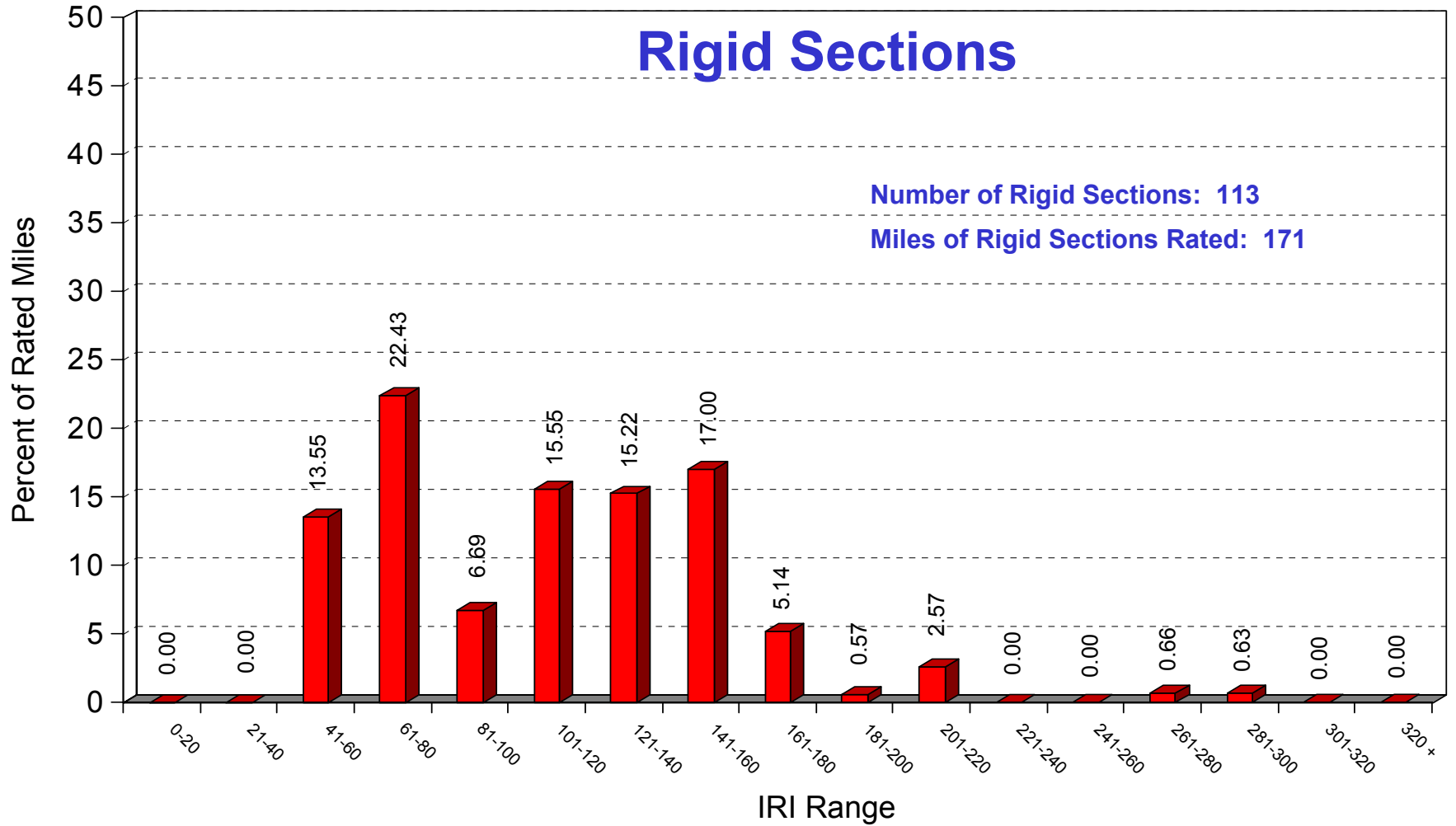


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2003 IRI Frequency Distribution



2003 IRI Frequency Distribution

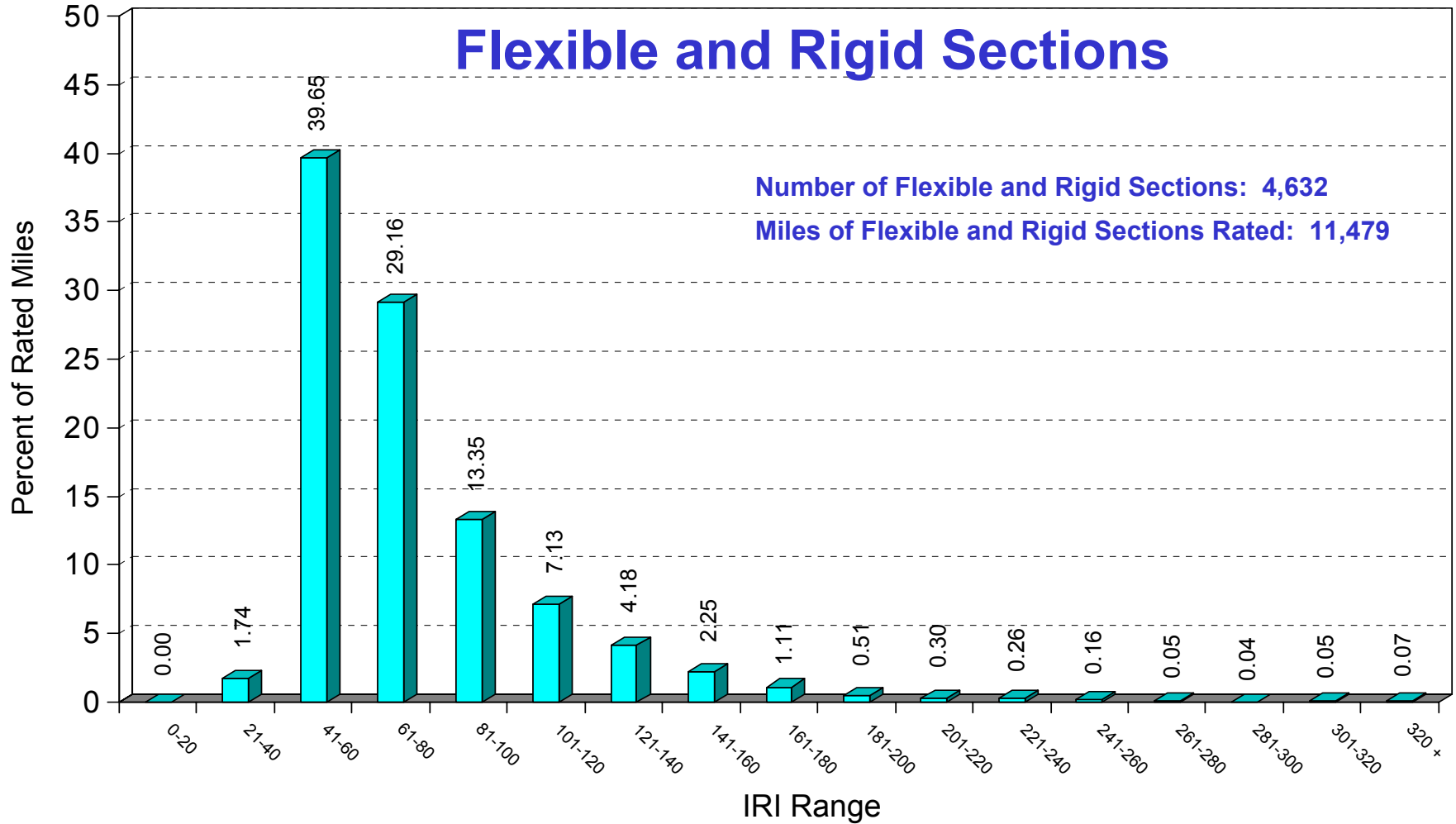


2003 IRI Frequency Distribution

Flexible and Rigid Sections

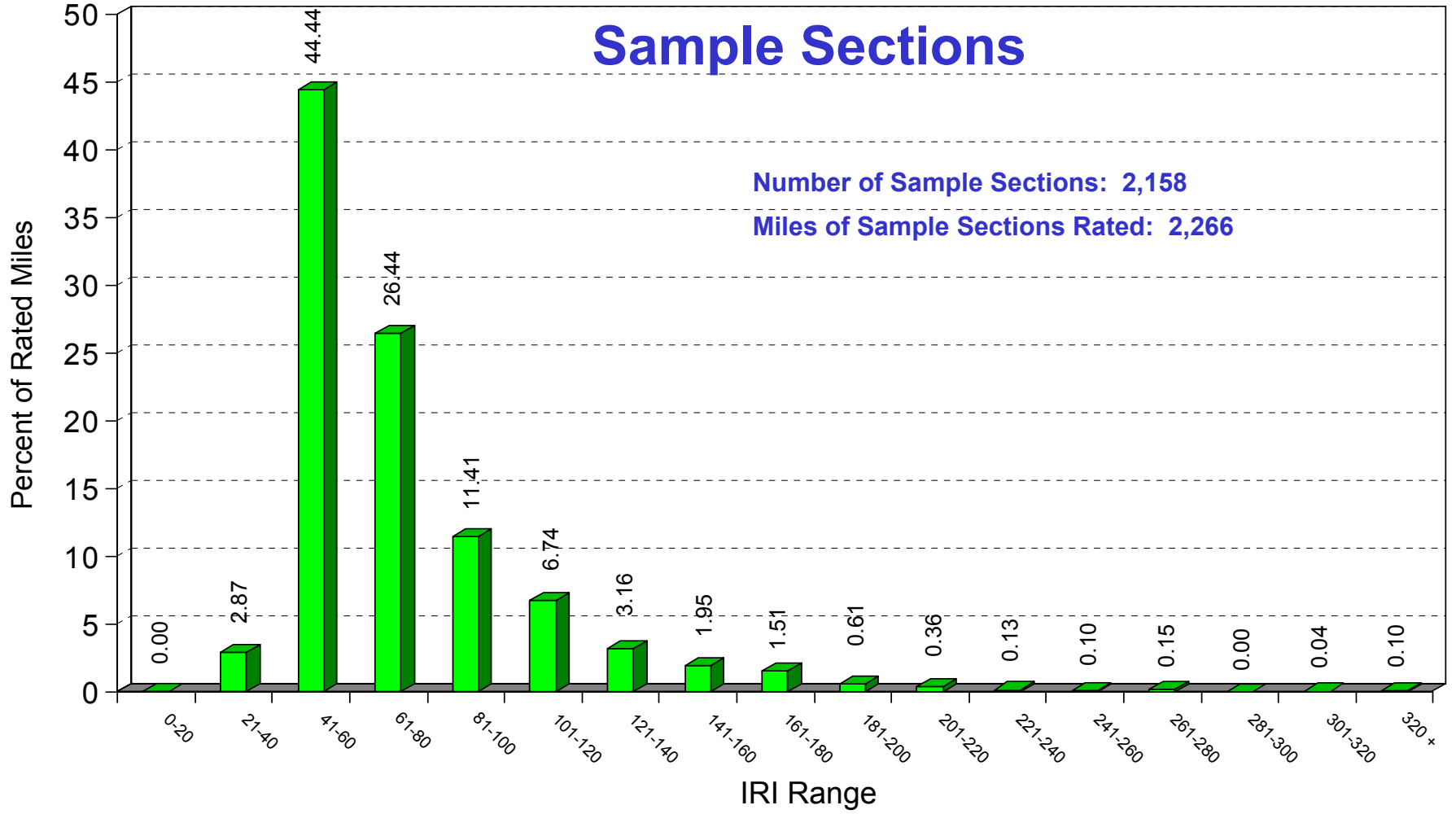
Number of Flexible and Rigid Sections: 4,632

Miles of Flexible and Rigid Sections Rated: 11,479

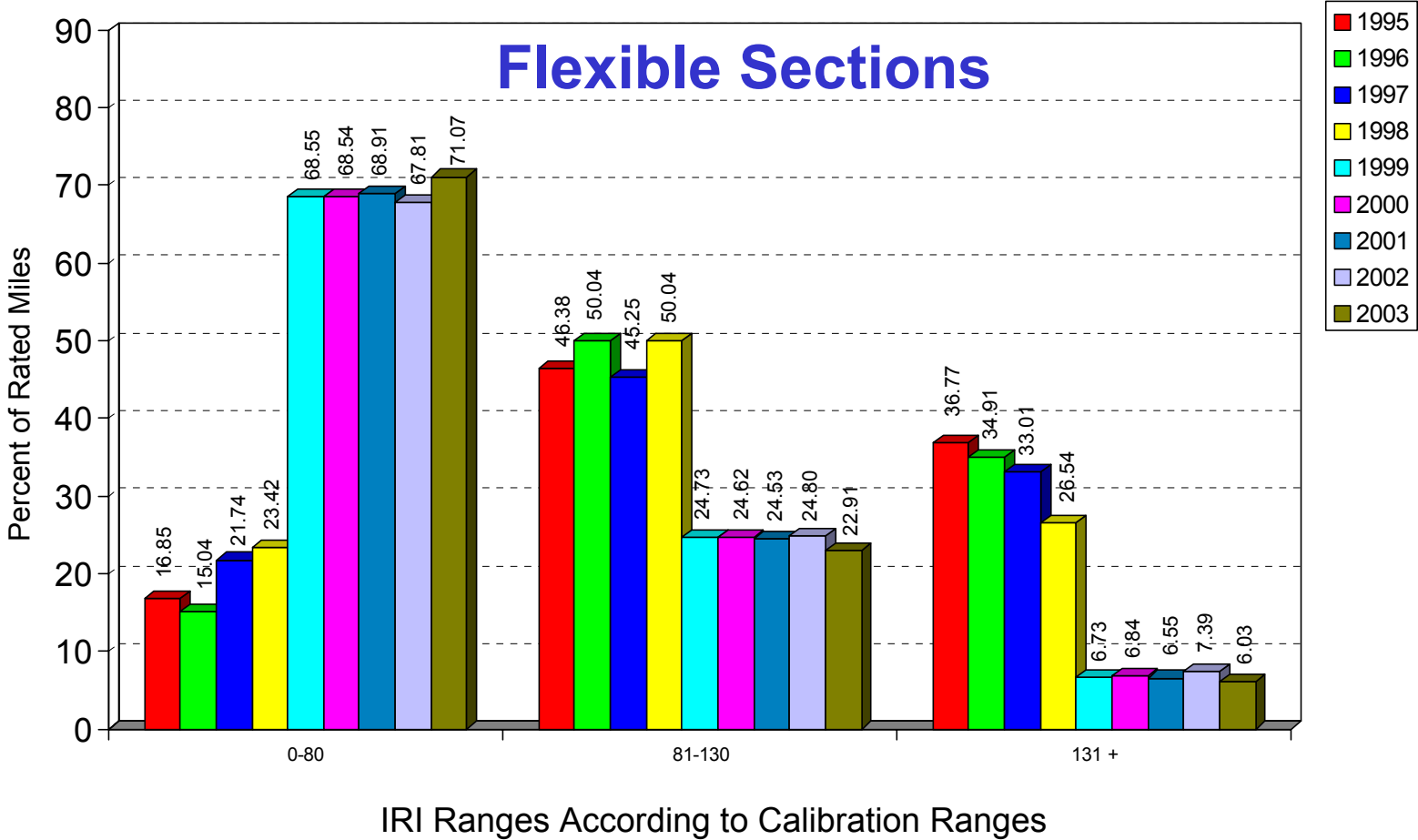


2003 IRI Frequency Distribution

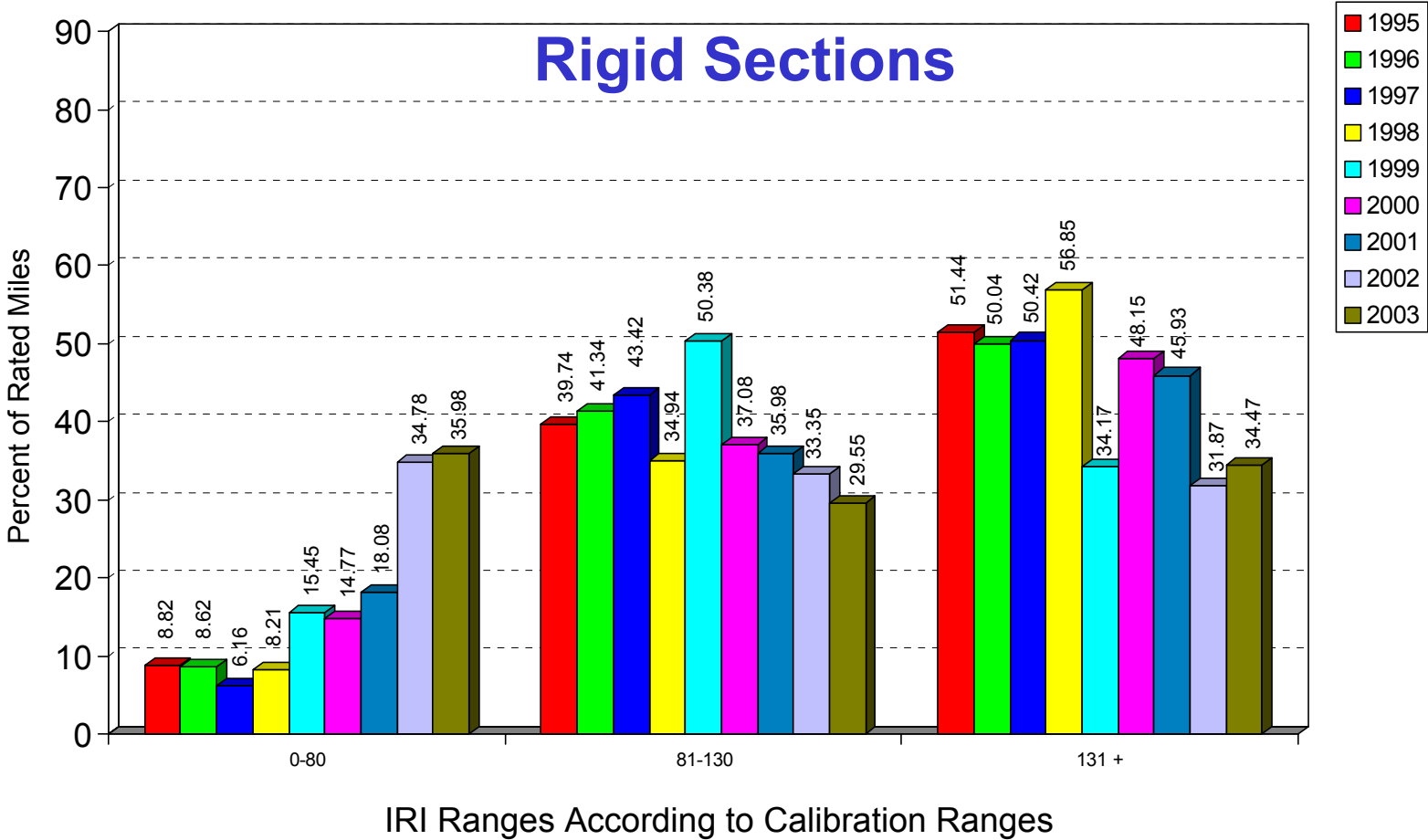
11



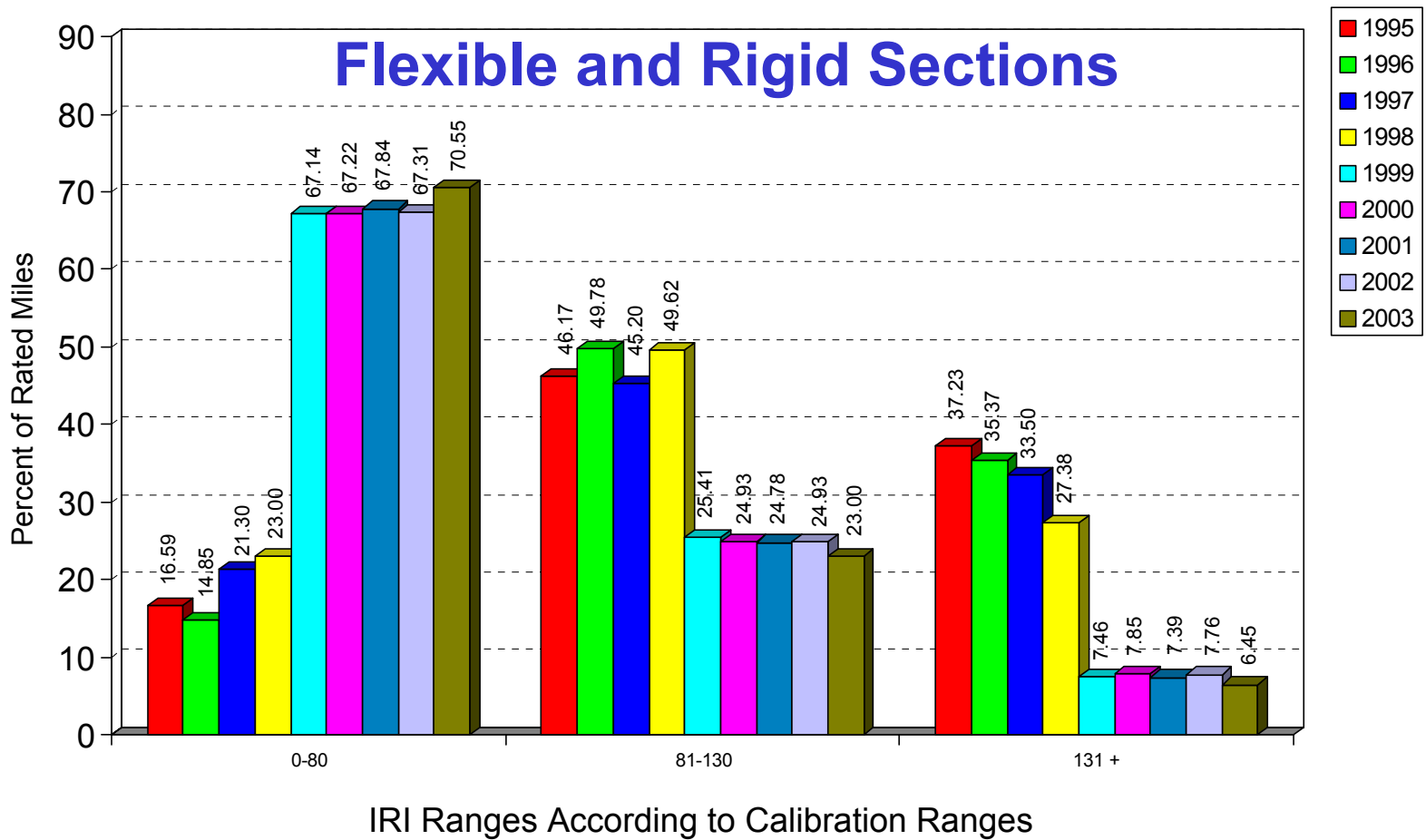
Percent HPMS Rated Miles vs. IRI Range (1995 – 2003)



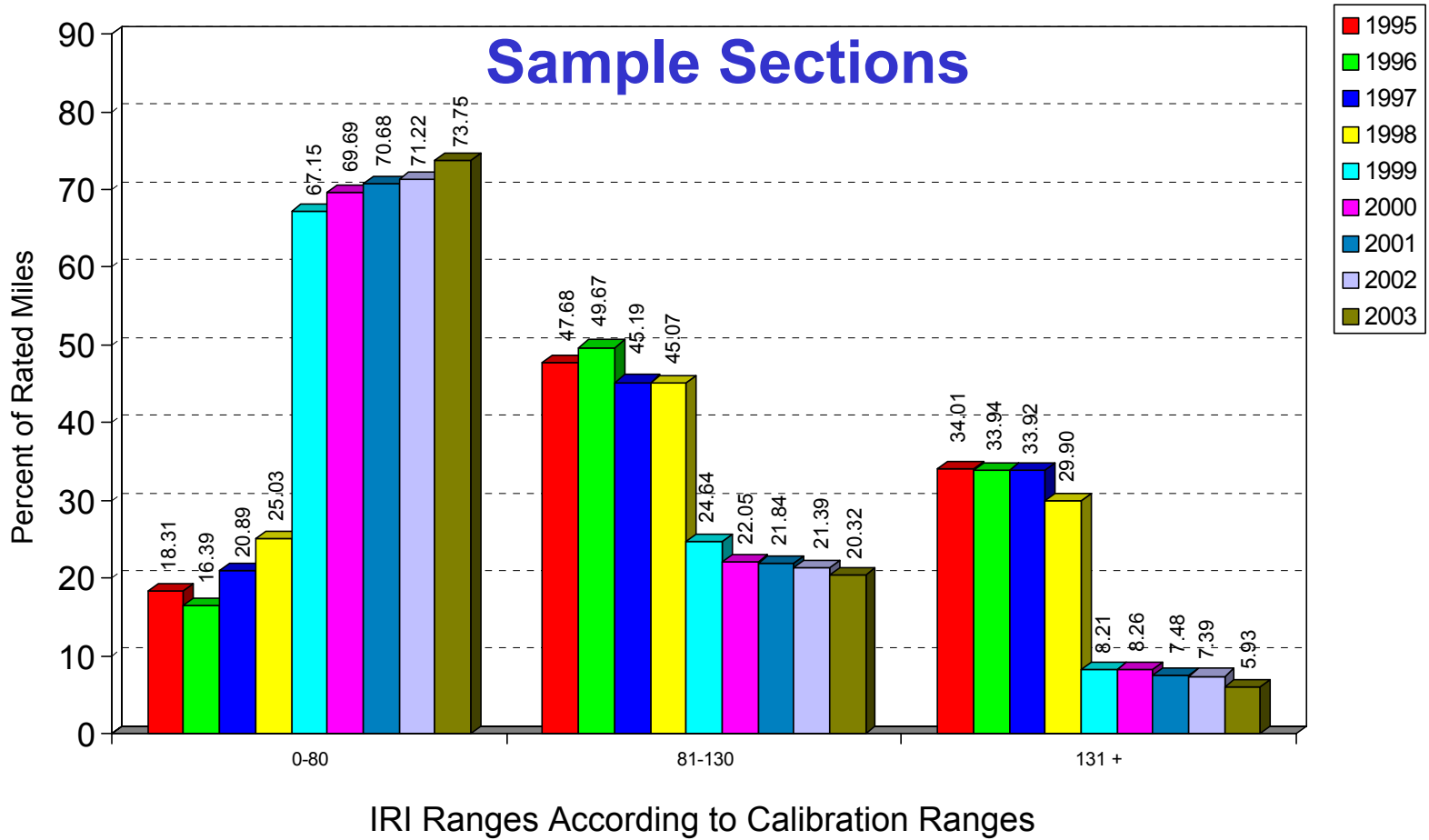
Percent HPMS Rated Miles vs. IRI Range (1995 – 2003)



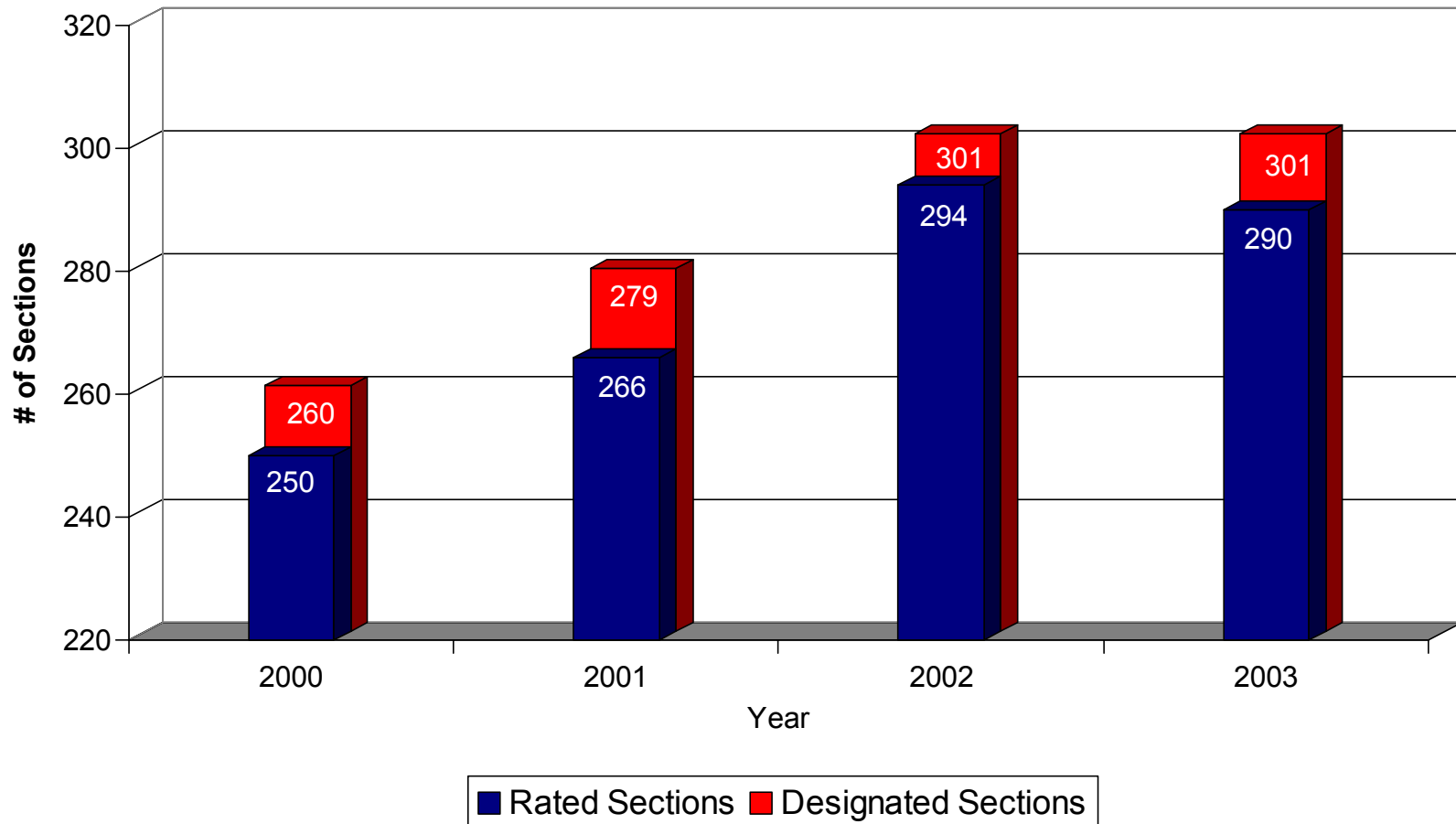
Percent HPMS Rated Miles vs. IRI Range (1995 – 2003)



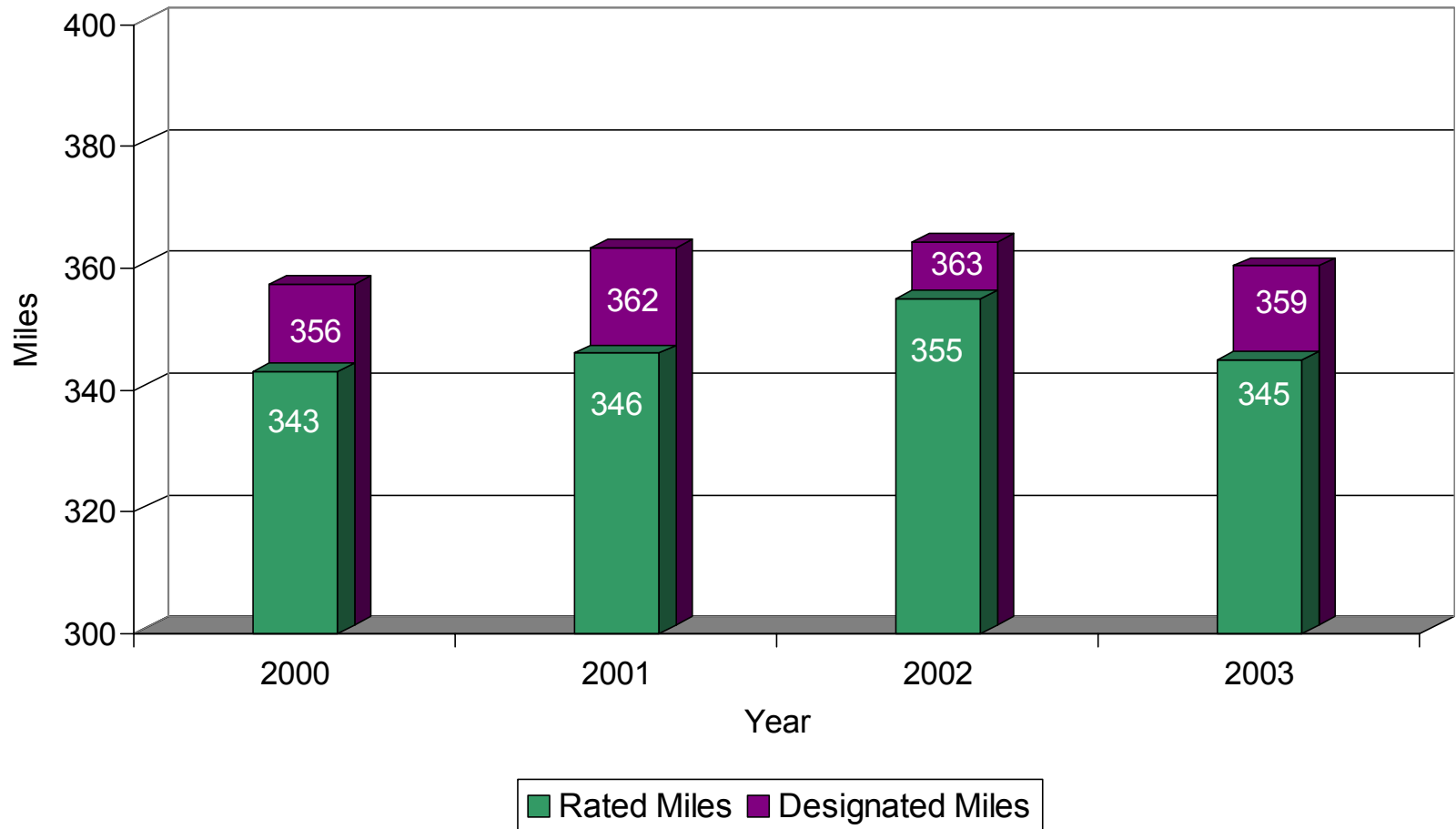
Percent HPMS Rated Miles vs. IRI Range (1995 – 2003)



HPMS Off-System

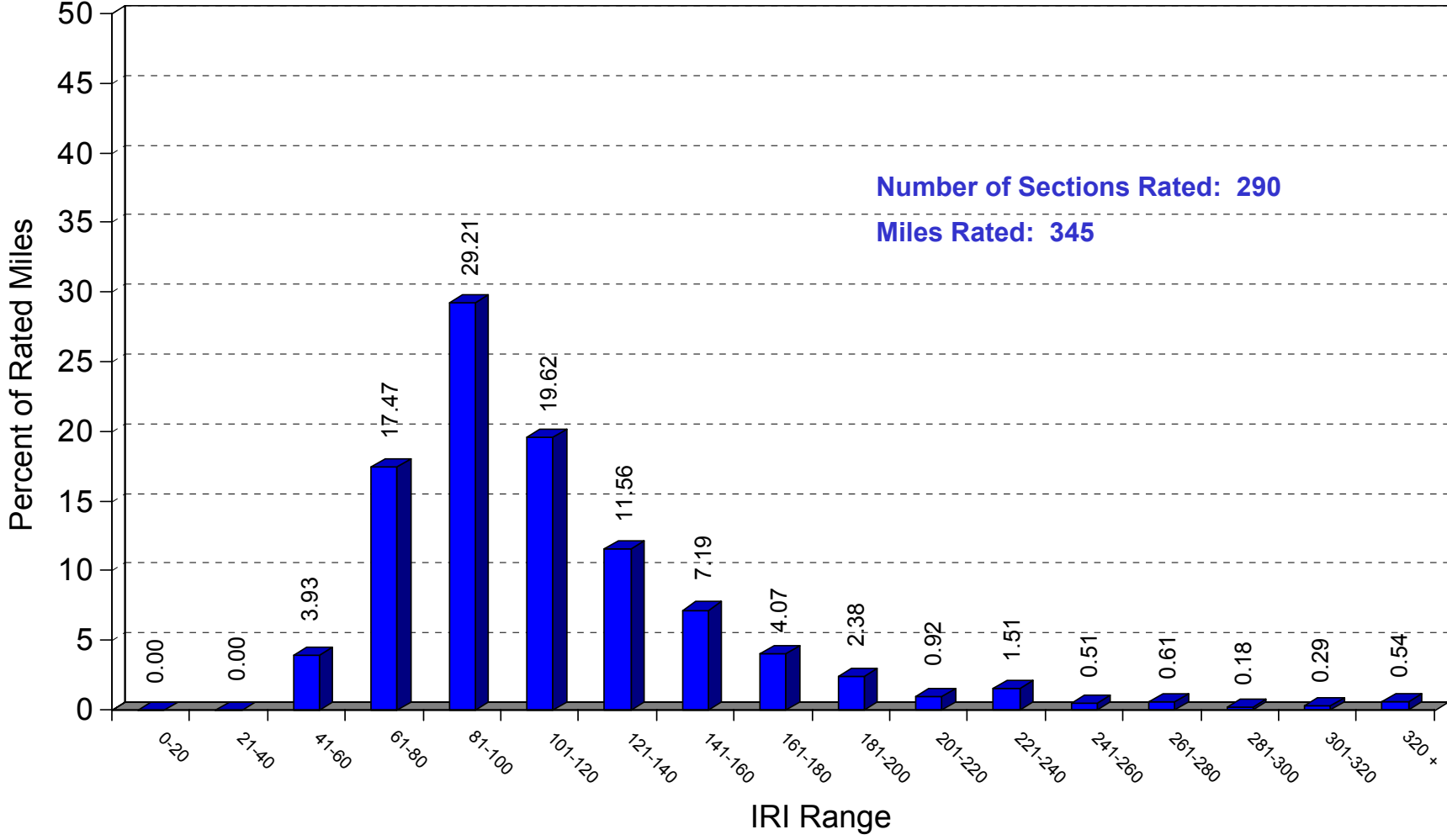


HPMS Off-System



2003 IRI Frequency Distribution

Off-System HPMS



Percent of Rated Miles vs. IRI Range (2000 – 2003) Off-System HPMS

