

# STATE OF FLORIDA



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**1999  
HIGHWAY PERFORMANCE  
MONITORING SYSTEM  
FACTS & FIGURES**

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**FL/DOT/SMO/99-430**

**April 1999**

**STATE MATERIALS OFFICE**

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## **What Is HPMS?**

The Highway Performance Monitoring System (HPMS) is both a statewide and a national information system that addresses all the Nation's public road mileage. It is a national highway transportation database and analytical simulation system that can serve a variety of users. The HPMS includes limited data on all public roads, summary data, and detailed sample data for rural, small urban, and urbanized areas within a State at known precision levels.

## **What Purpose Does HPMS Serve?**

The HPMS was developed in 1978 to serve highway transportation data and analytical needs at the national level. It replaced numerous uncoordinated annual State data reports as well as biennial special studies conducted by each State, resulting in a reduction in annual State data reporting. Several enhancements have sharpened its focus on timely issues and enhanced analytical tools.

Legislative mandates related to transportation, transportation monitoring programs, and air quality have a direct effect on national data needs, analytical mechanisms, and actions of states, municipalities, and FHWA. Traditionally, HPMS has been an integral part of policy planning. This includes the apportionment and allocation of federal-aid funds.

The data collected also support local, state, and federal transportation officials in adequately planning and administering safe and efficient transportation systems. These data also ensure that proper cost-effective means are being used to rehabilitate and preserve existing highway transportation infrastructure.

The HPMS database is unique because it directly ties together roadway physical, operational, usage (travel), pavement condition, and performance data that can be analyzed and summarized at sub-state, statewide, and national levels by highway system. A new 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 in Gainesville, collects data on selected sections of the State Highway System on a yearly basis. The State Materials Office began collecting ride data for the HPMS, in conjunction with the Pavement Condition

Survey (PCS) in 1991. Prior to the collection of the 1994/1995 survey data, Florida reported sample sections only. However, with the collection of the 1994/1995 survey data, the Department was required to report the ride values in one direction (flexible and rigid) from the Pavement Management System (PMS) database. The flexible and rigid pavement sections were in addition to the HPMS sample sections. The State Materials Office collects ride values in both directions for divided roadways on the entire state maintained roadway system for PMS purposes.

Currently, FHWA requires the Florida Department of Transportation to collect HPMS Ride data, in one direction only, on the entire State Highway System (“*Designated Sections*”). These Sections follow the same section lengths and breaks as the PCS Sections. The sections resulting from this data collection are labeled “*Rated Sections*”. Some of the Designated Sections do not get rated because of construction projects or other causes. In addition, FHWA 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 called “*Sample Sections*” and are identified by number, county section number, beginning milepost and ending milepost.

Prior to the 1998/99 data collection the ride values were reported as International Roughness Index ( $IRI_{NF}$ ) values, not filtered. IRI is rigorously defined as a specific mathematical transform of a true profile. The 1998/1999 Survey was accomplished with new equipment (laser sensors replaced ultrasonic sensors). The ride values reported are International Roughness Index ( $IRI_{F300}$ ) filtered to a 300-foot wavelength. Because IRI is a property of the true profile, it can be measured with any valid profiler. The calculation of IRI takes into consideration wavelengths between 4 and 100 feet. Wavelengths outside this band do not contribute to the roughness seen by vehicles at speeds near 50 mph. Because different analysis apply different "filters" to a measured profile, a profilometric method will generally be valid for some applications and not for others. IRI values are reported in compliance with the FHWA order M 5600. 1B, appendix J, dated August 30, 1993.

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

## **How Does Data Collection Procedures Effect HPMS Data?**

Some of the problems that exist with the data collection process are that not all states process and report HPMS data the same way. Profilers collect longitudinal profile data

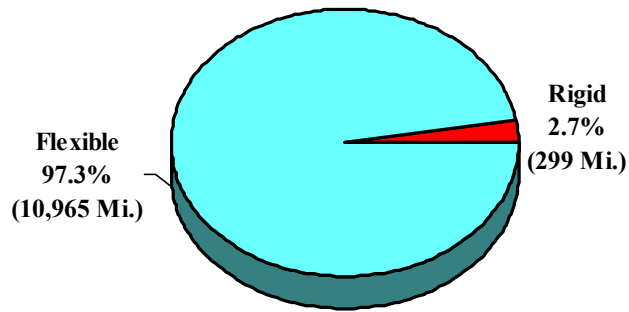
that is passed through a vehicle simulation computer program to calculate the International Roughness Index (IRI) values. However, the profile data can be averaged differently (moving average, straight average, etc.). The profile data can also be filtered differently (no filtering, 300 foot wavelength, etc.). In addition, the profile data can be collected using either ultrasonic sensors, laser sensors, optical sensors or infrared sensors. The sensors can be spaced differently on the test vehicle (different locations).

States report the collected IRI values in a variety of ways, left wheel path, right wheel path, average wheel path, half car simulation, etc. States also collect the data in a variety of ways. Although standards do exist (Appendix J), that specify the way the data is to be collected and reported, the interpretation is not always the same between states. In addition some states report HPMS data from the same section length already being collected as part of their Pavement Management System, rather than the specific HPMS sample section length.

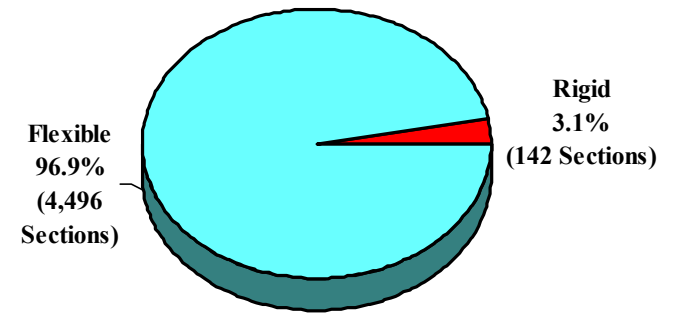
Without specifying the details of the equipment being used to collect ride data it may not be realistic to compare data between states.

# 1999 HPMS Sections Statewide

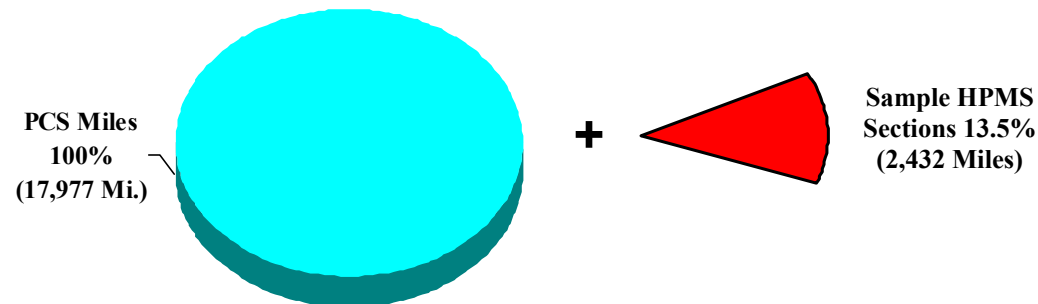
**HPMS Rated Miles: 11,264 Mi.  
(One Direction from PCS)**



**Number of HPMS Sections: 4,638  
(One Direction from PCS)**

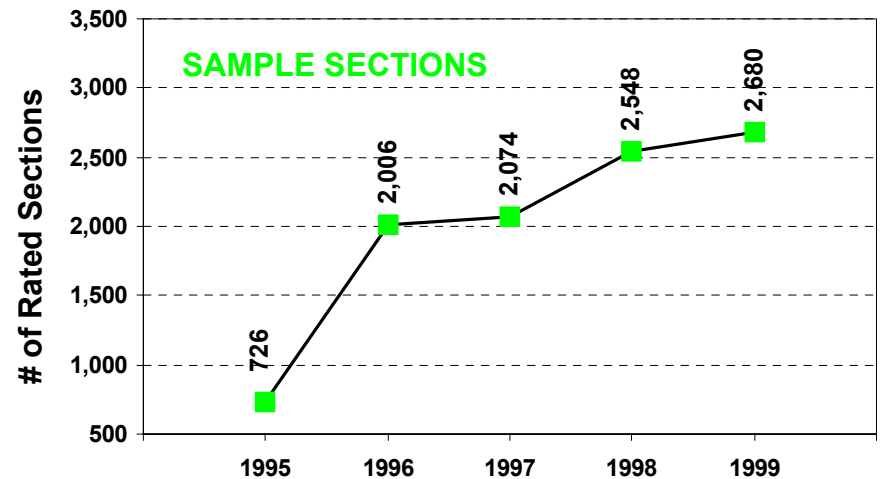
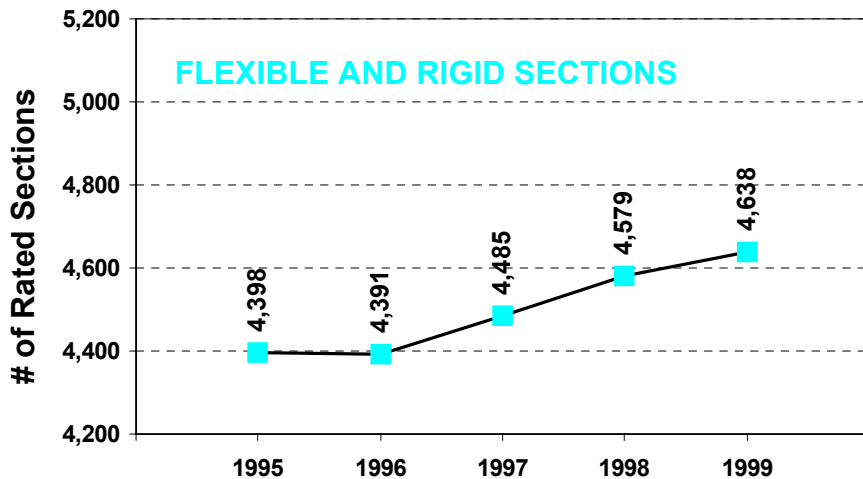
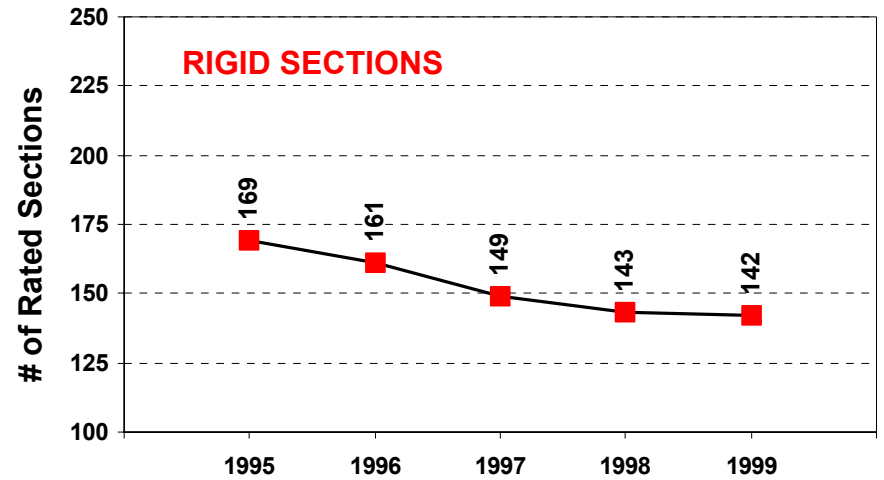
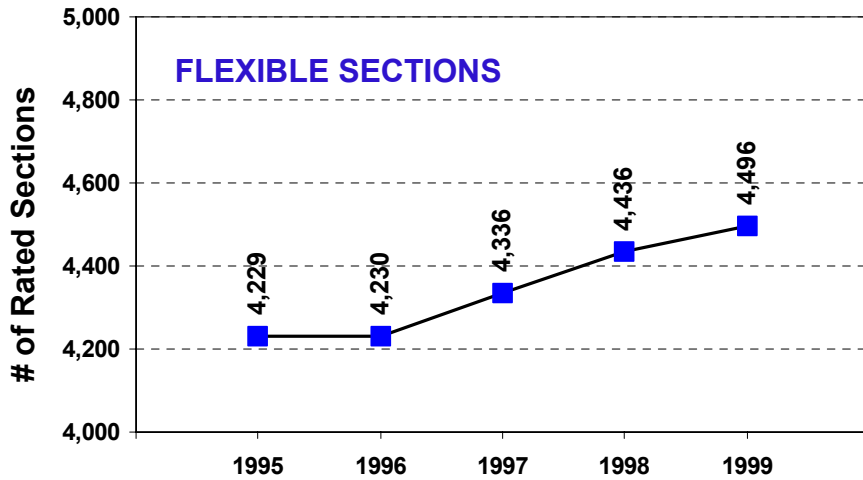


**Total PCS Rated Miles: 17,977 Mi.  
(Both Directions)**



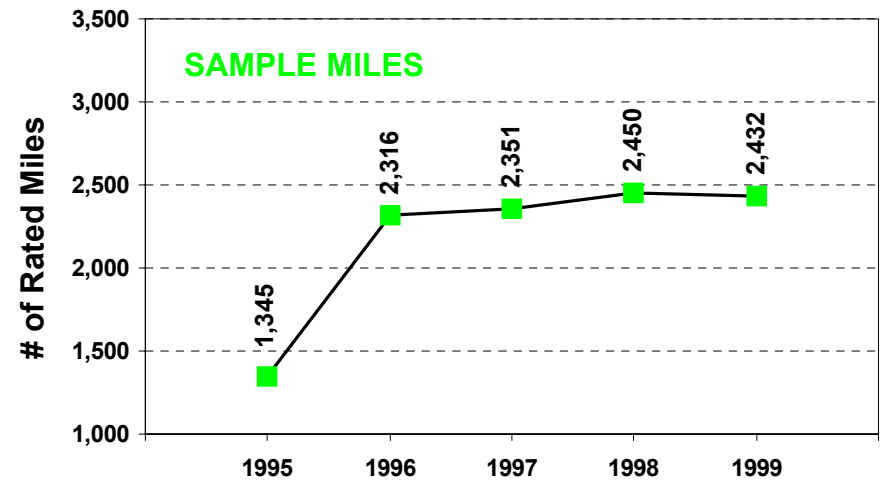
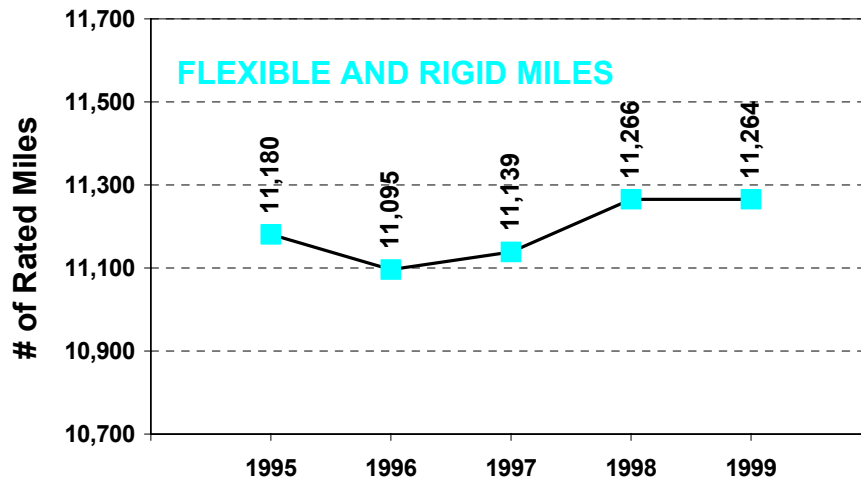
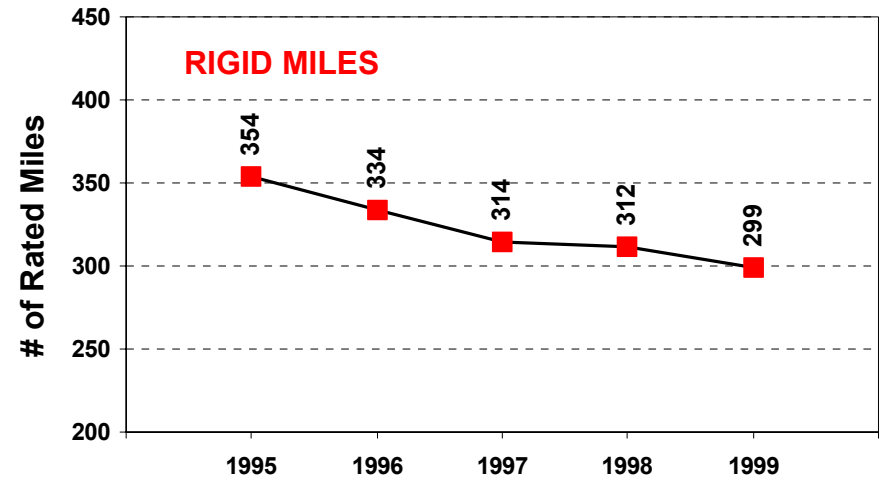
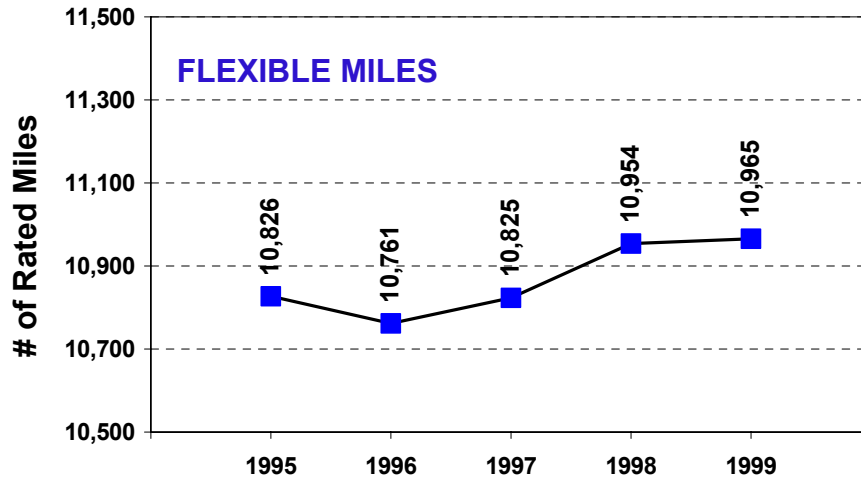
**Sample HPMS  
Sections are  
extracted from PCS  
data and reported to  
FHWA**

# Number of HPMS Rated Sections

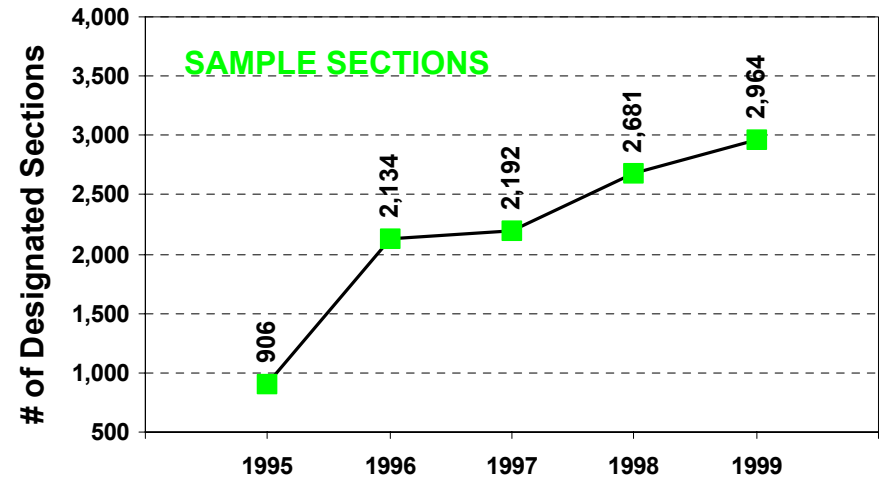
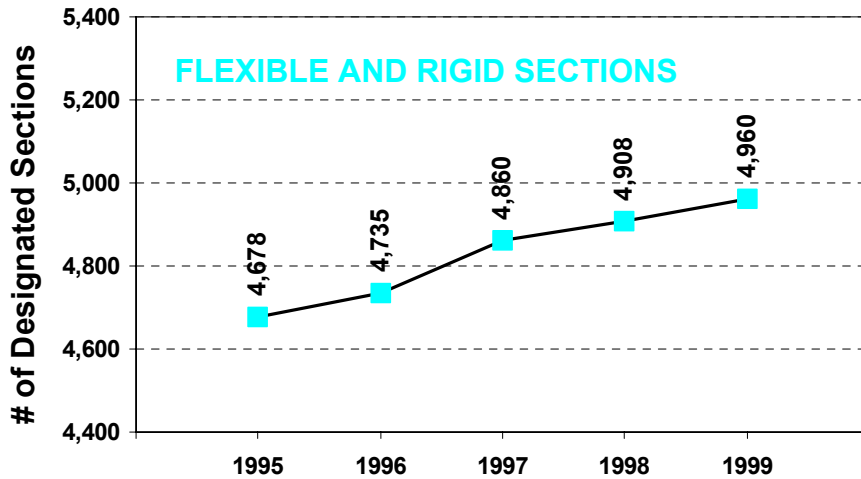
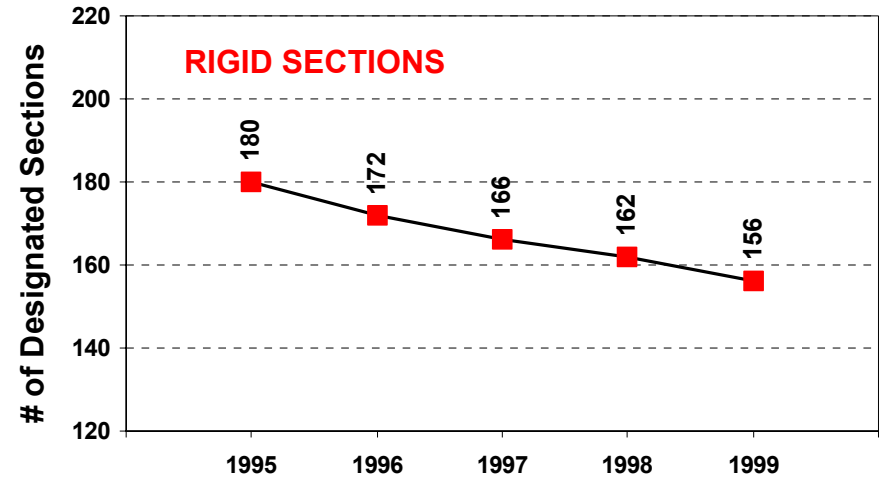
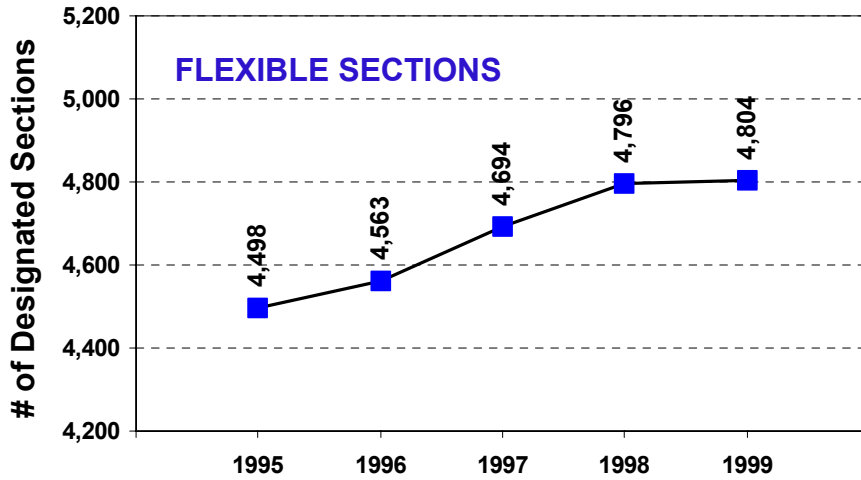




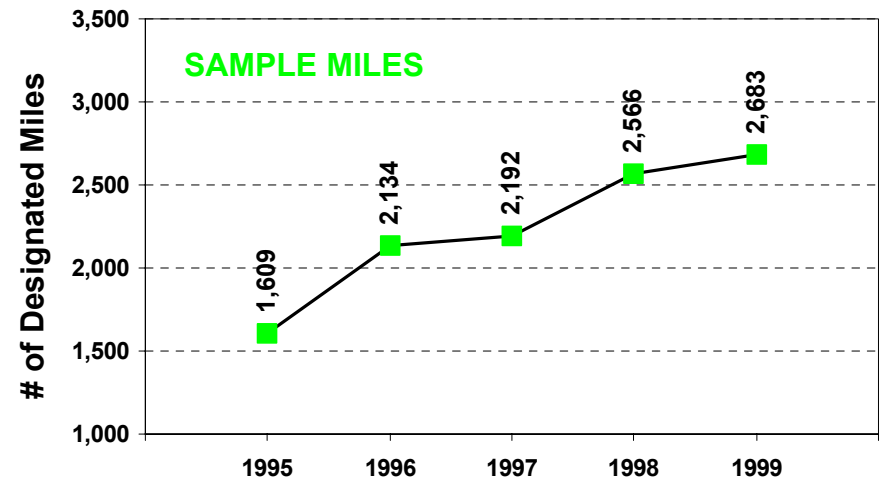
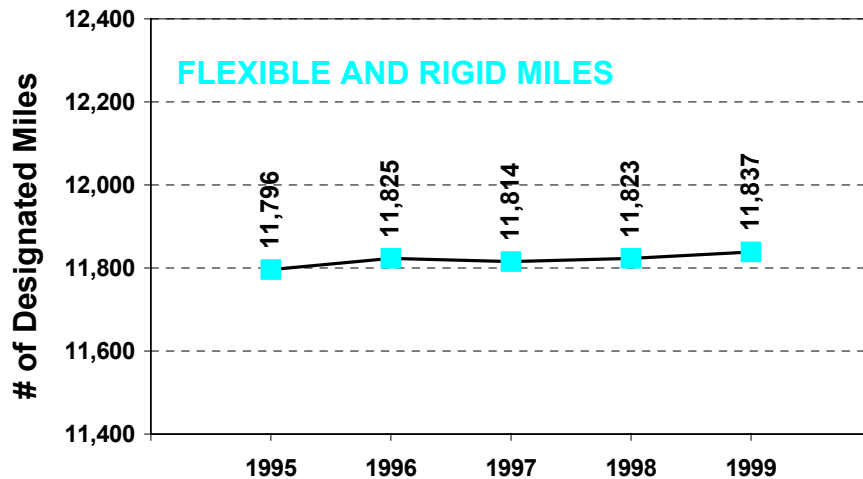
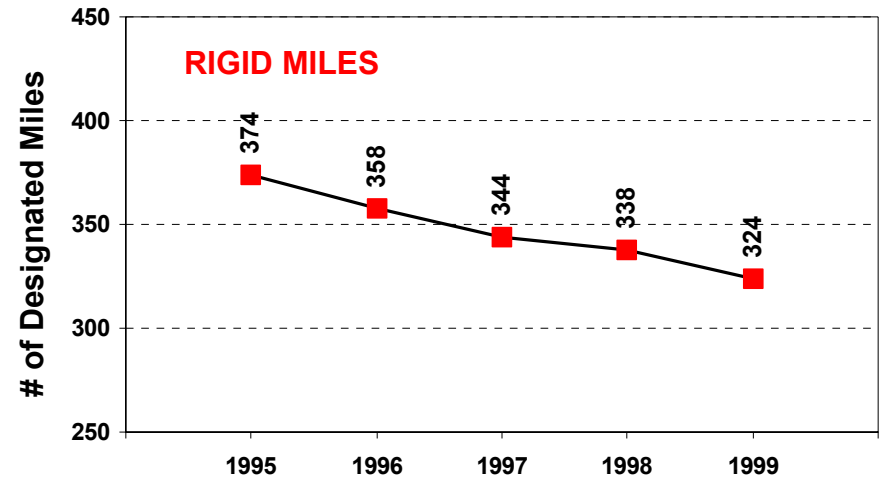
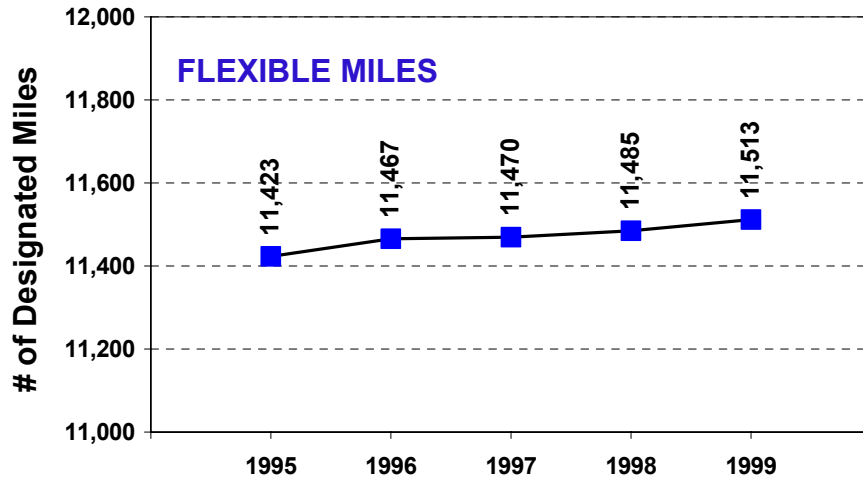
# Number of HPMS Rated Miles



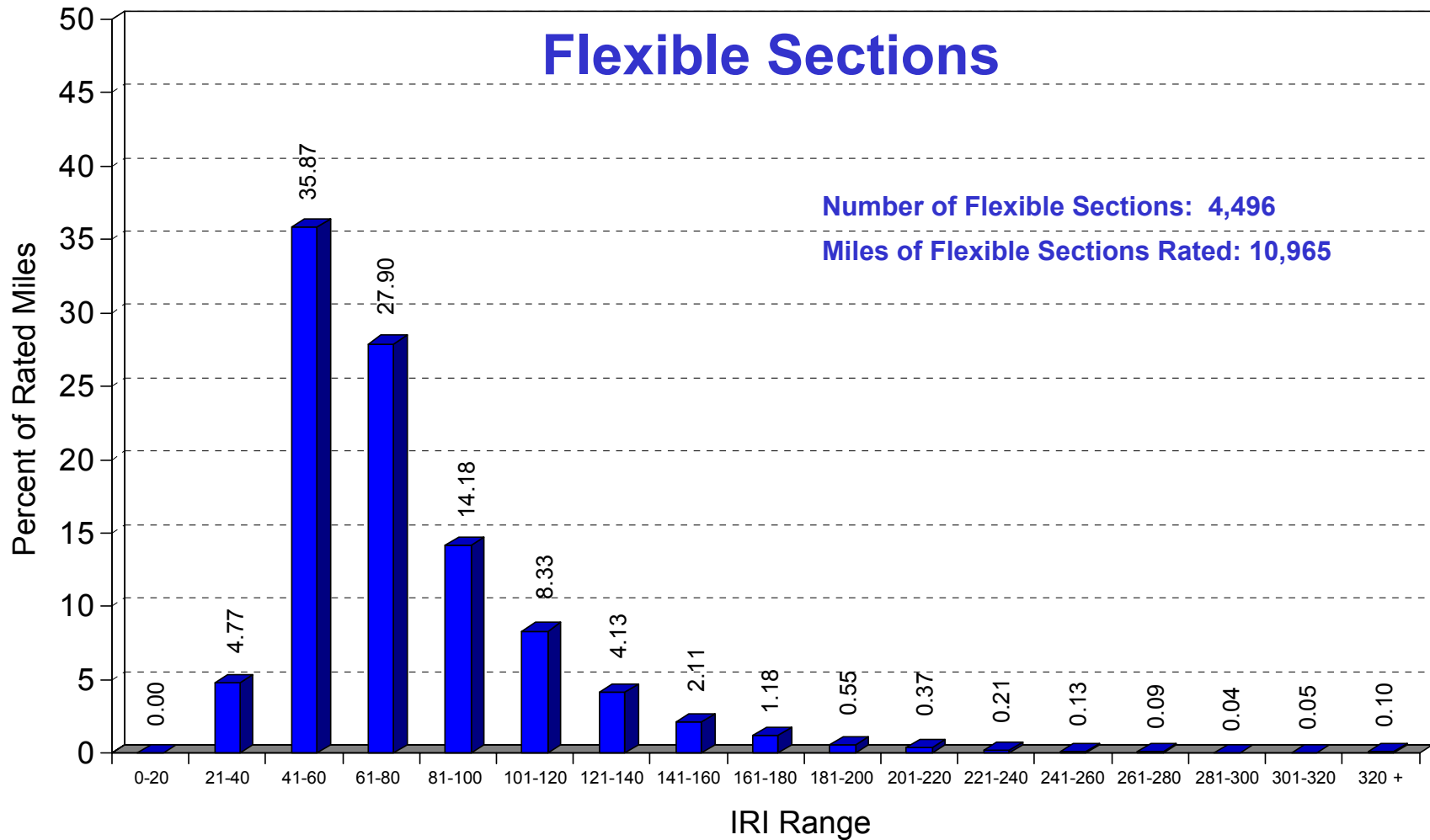
# Number of HPMS Designated Sections



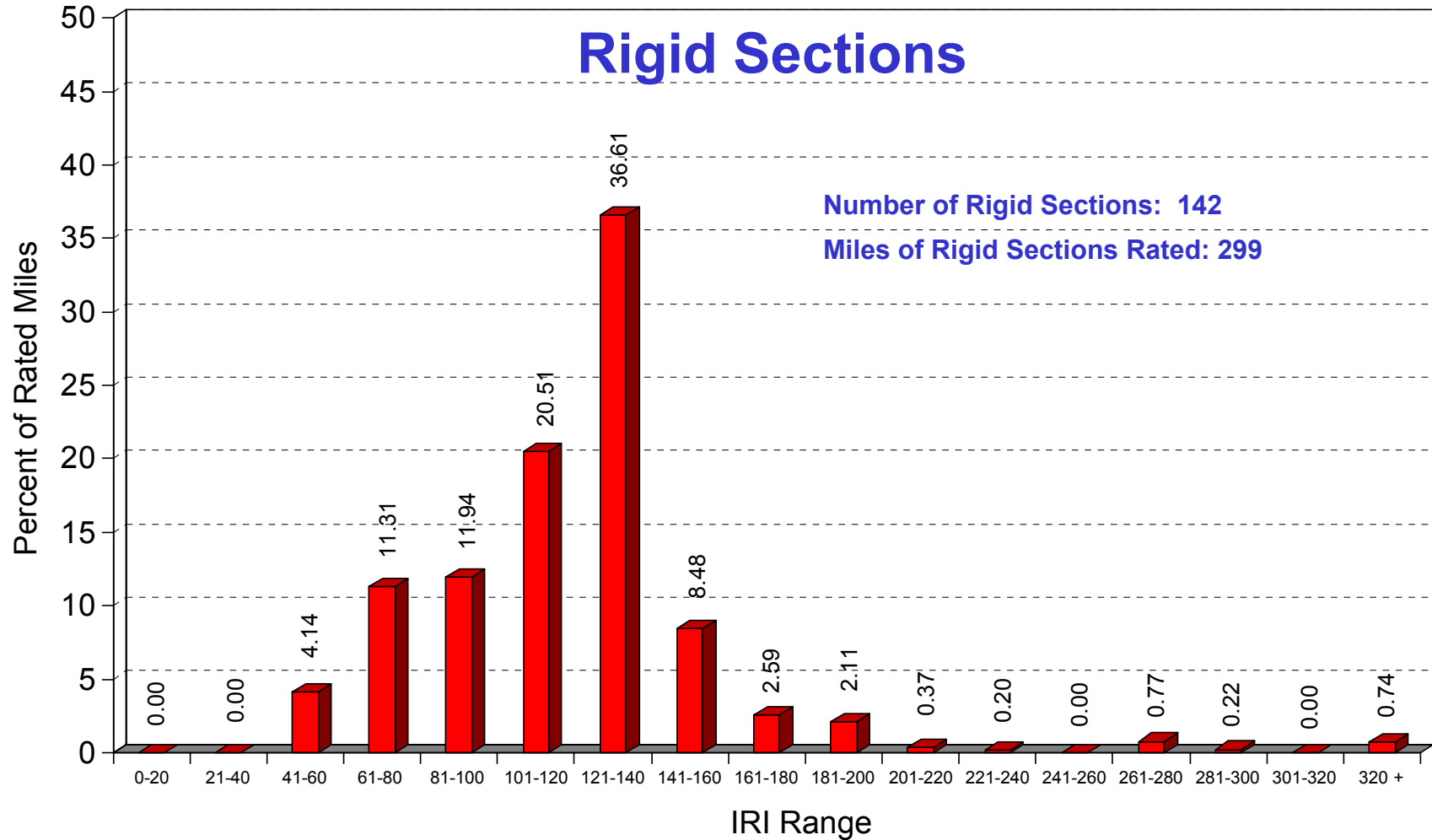
# Number of HPMS Designated Miles



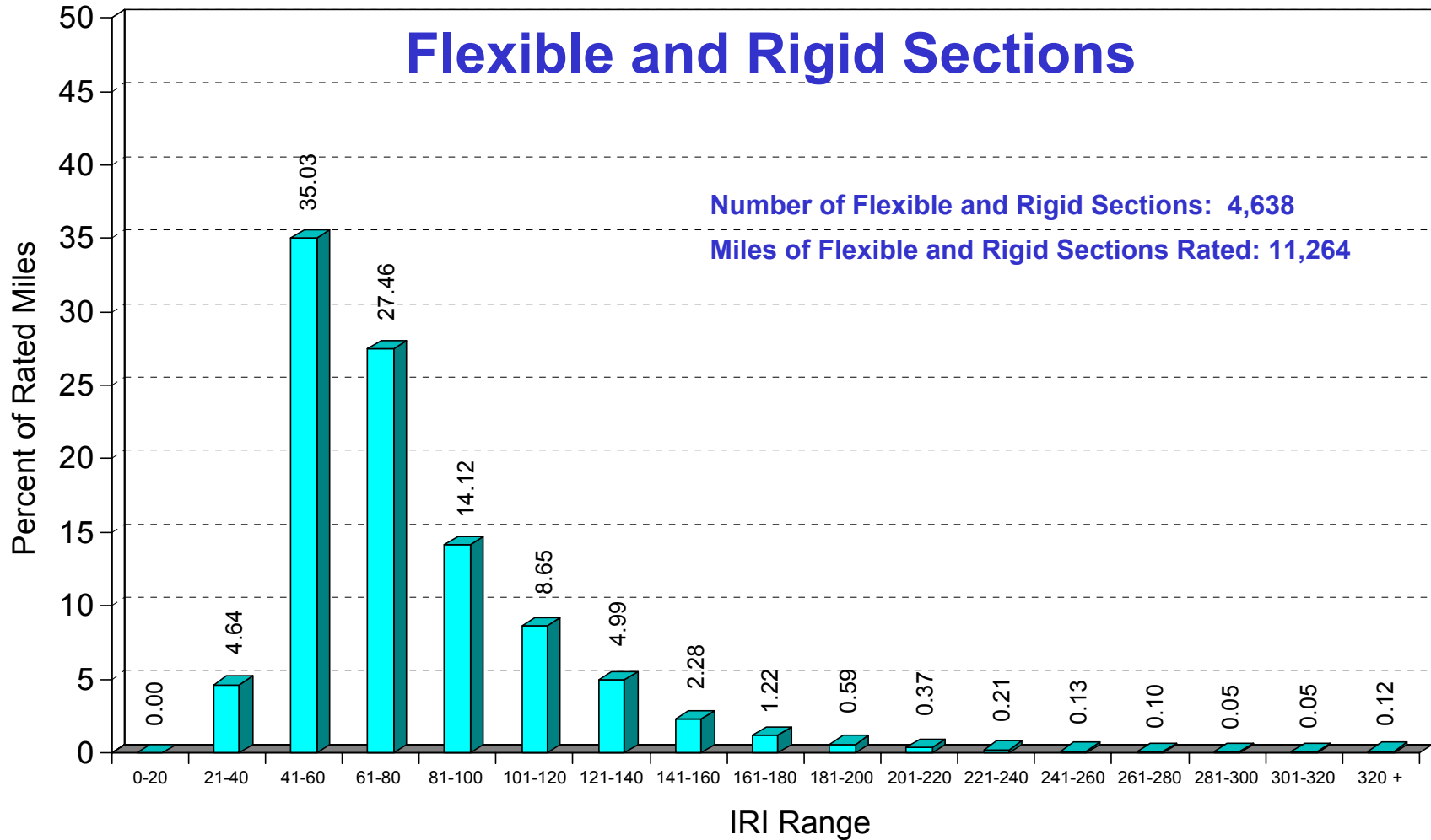
# 1999 Frequency Distribution of IRI Statewide



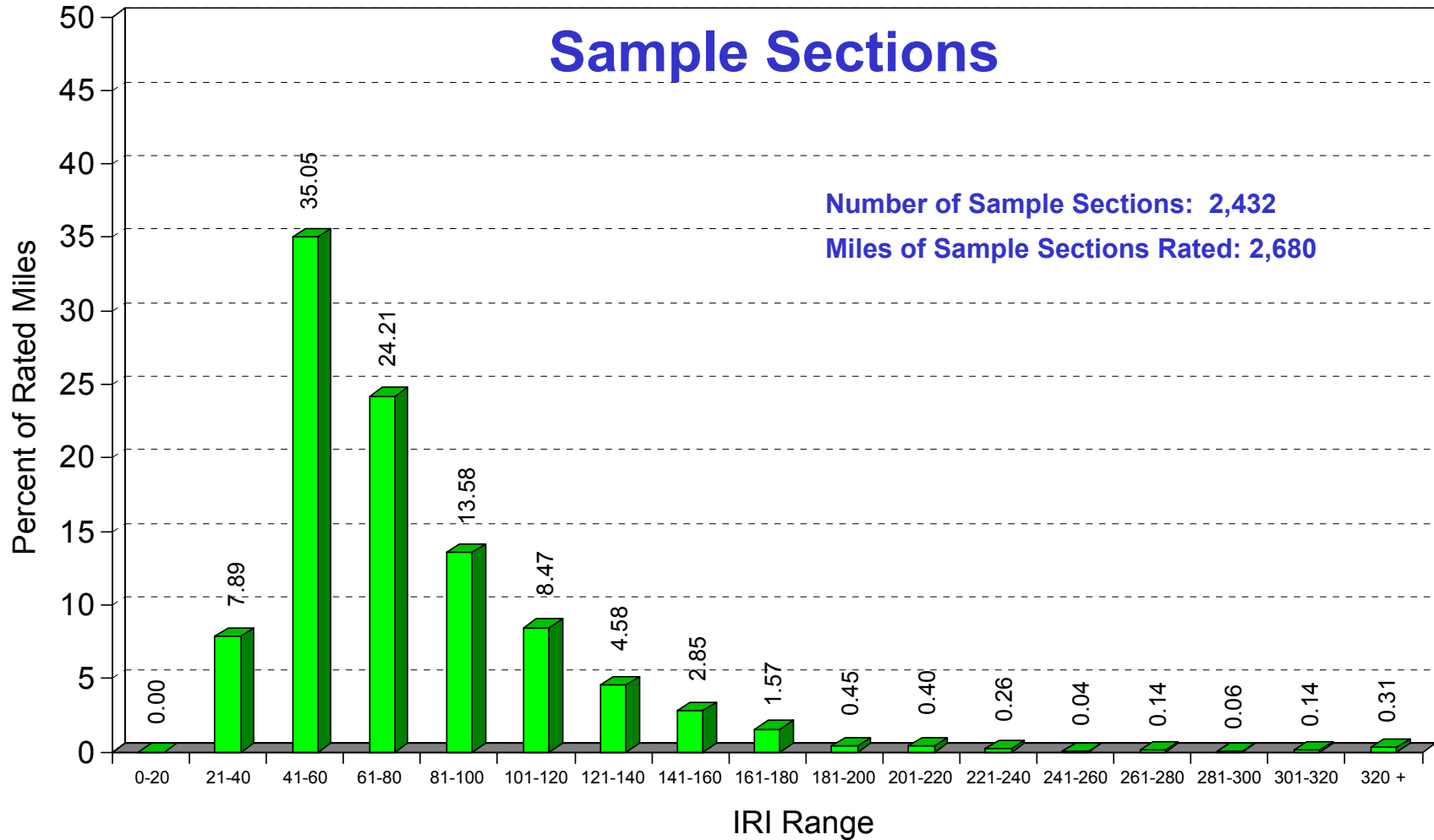
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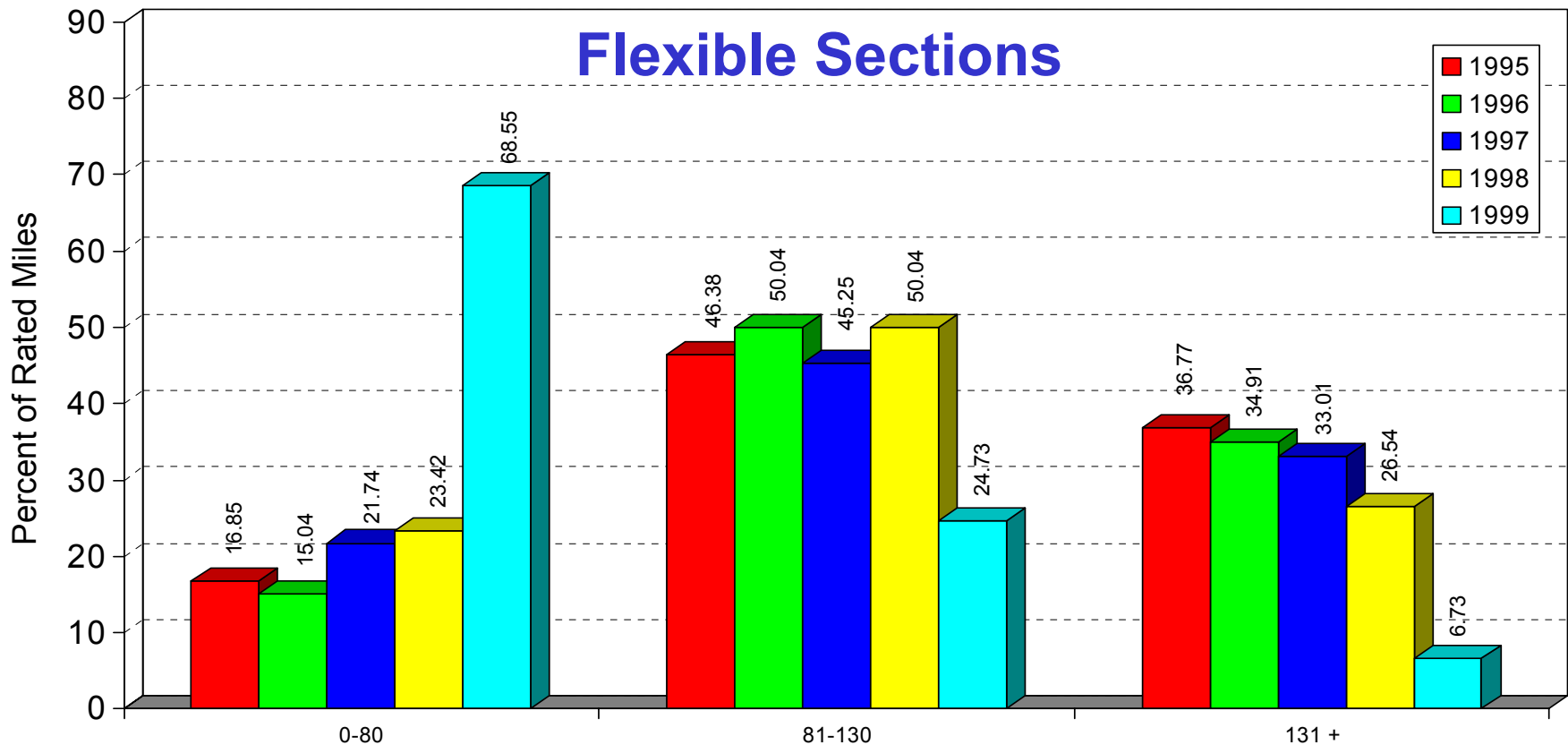
# 1999 Frequency Distribution of IRI Statewide



# Percent of Rated Miles within IRI Ranges from 1995 – 1999

Statewide

Flexible Sections



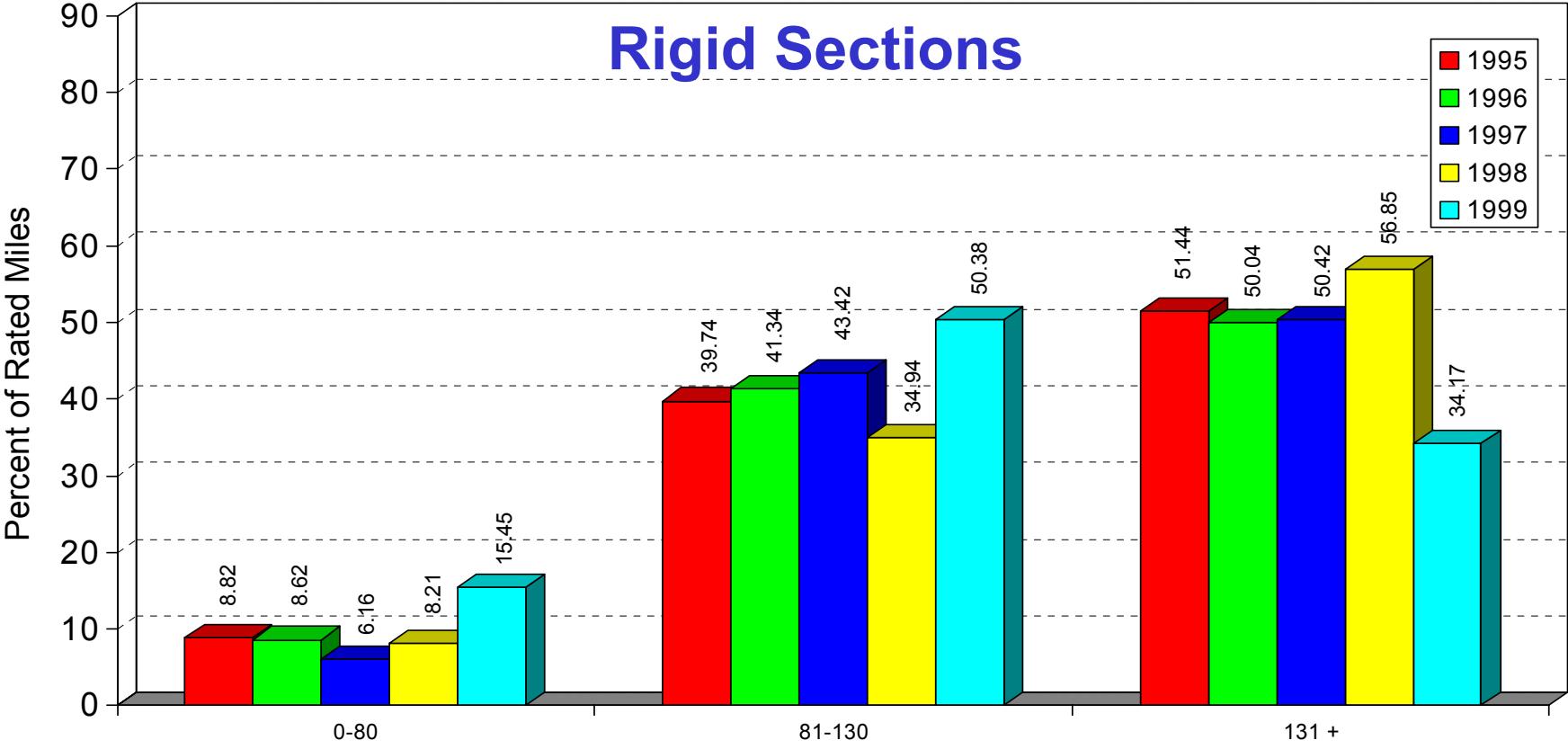
IRI Ranges According to Appendix J of the HPMS Manual



# Percent of Rated Miles within IRI Ranges from 1995 – 1999

Statewide

Rigid Sections

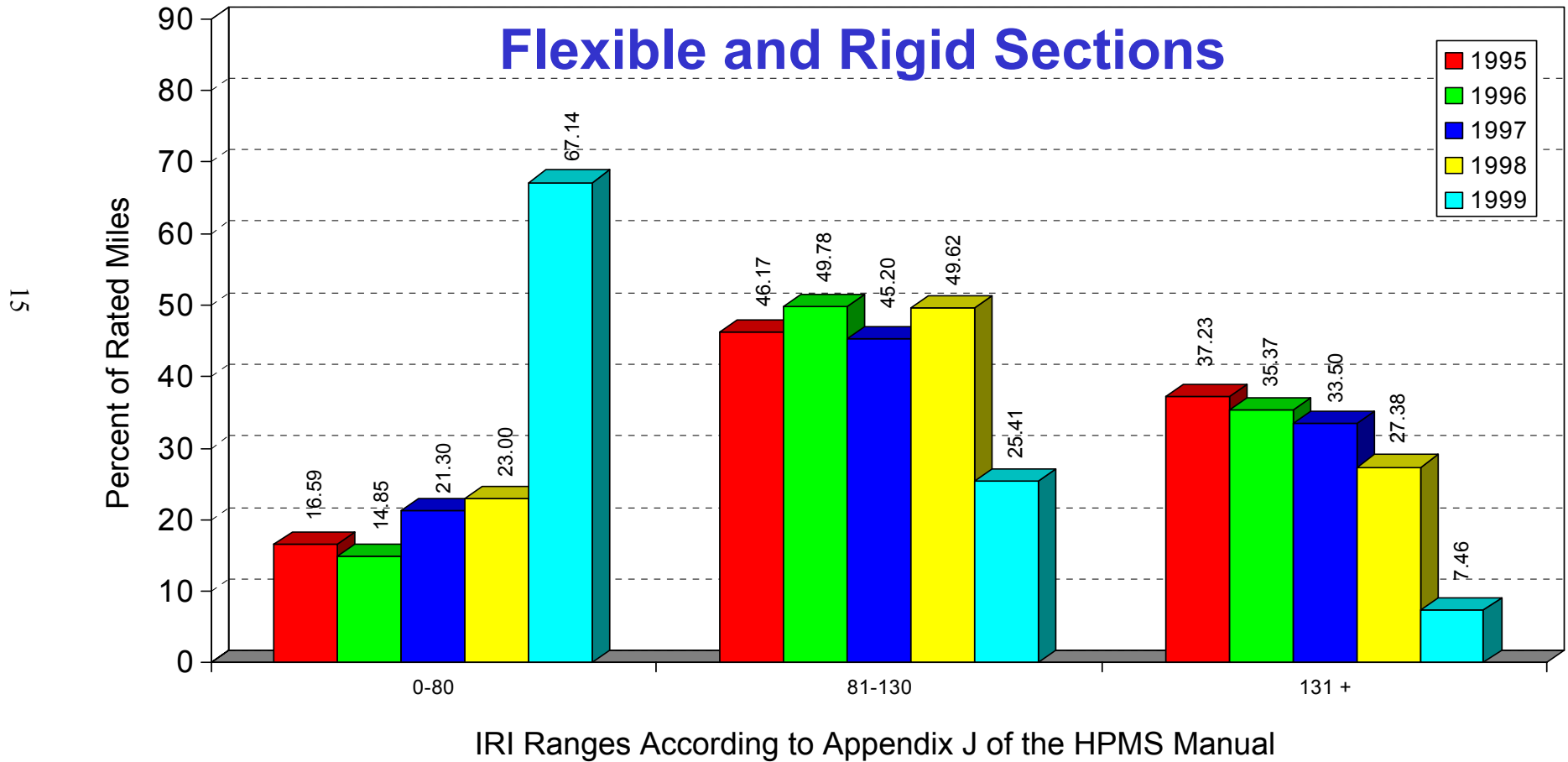


IRI Ranges According to Appendix J of the HPMS Manual

# Percent of Rated Miles within IRI Ranges from 1995 – 1999

## Statewide

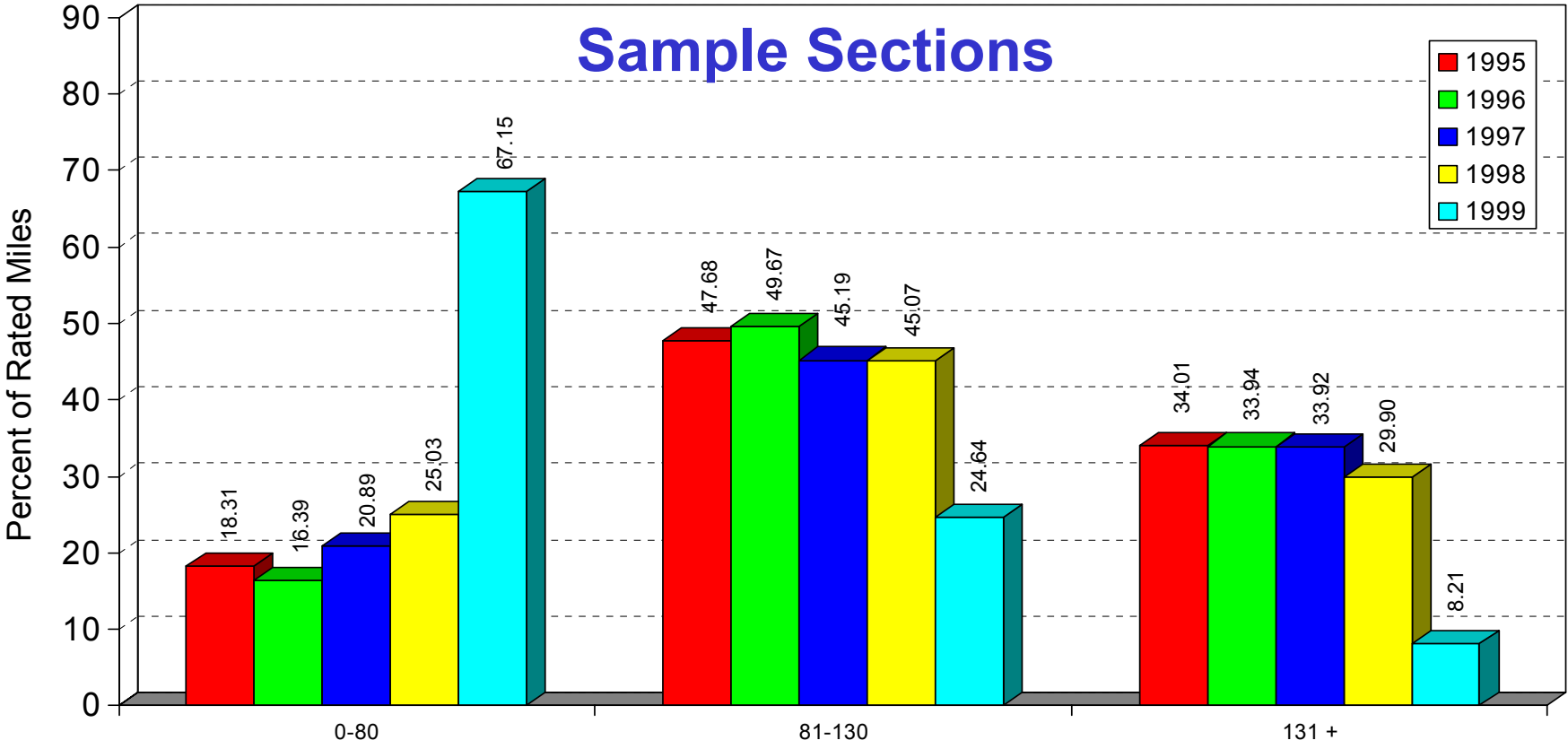
### Flexible and Rigid Sections



# Percent of Rated Miles within IRI Ranges from 1995 – 1999

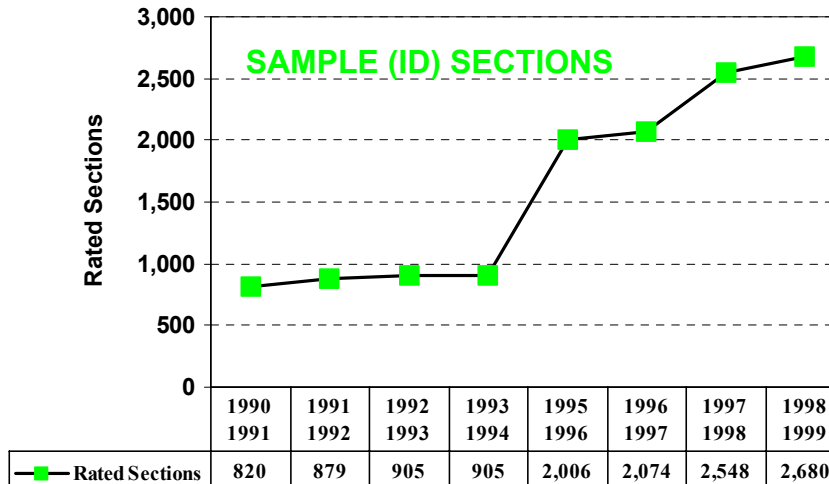
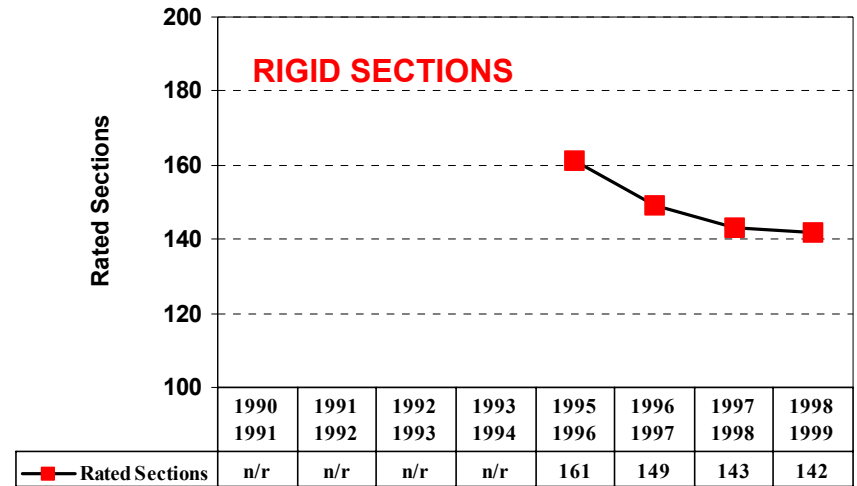
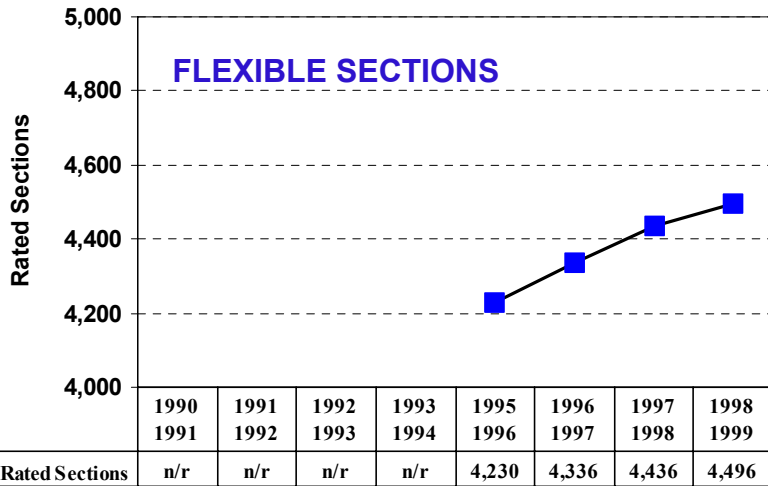
Statewide

Sample Sections



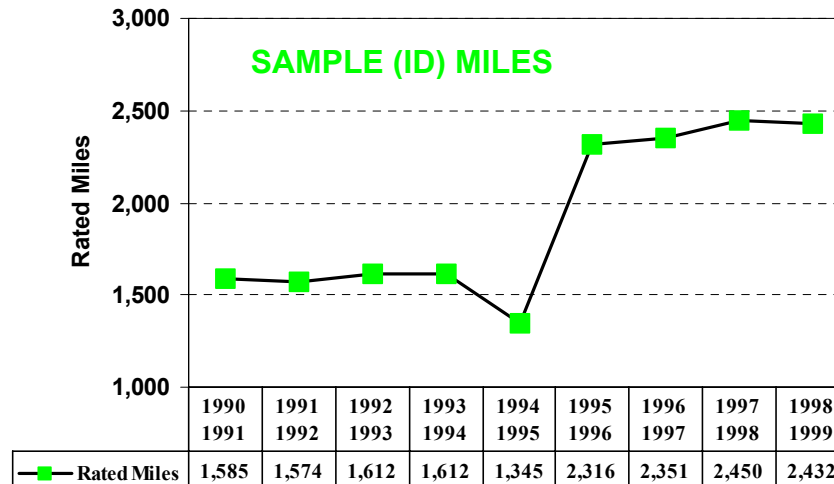
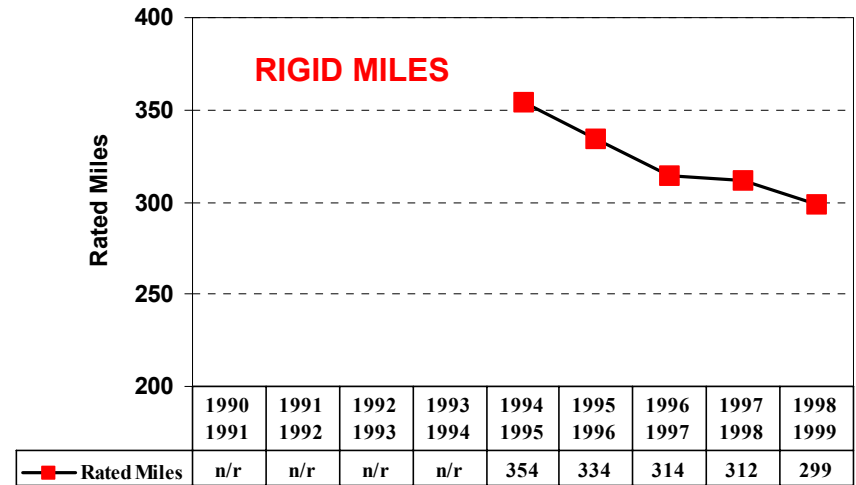
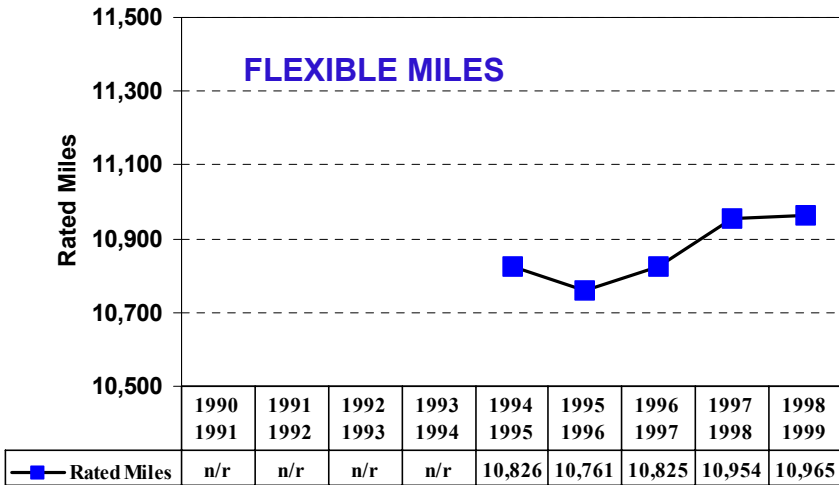
IRI Ranges According to Appendix J of the HPMS Manual

# Number of HPMS Rated Sections



Note: The Number of Sample (ID) Sections for 1998-1999 is the Number of Sections being requested for reporting.  
n/r = not required.

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