



Pavement Evaluation 2019



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Roanoke, Virginia

Evolution of HPMS Pavement Condition Data

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Outline

- Introduction
- Objectives
- Quality Check of HPMS Datasets
- Sampled Mileage of HPMS Datasets
- Comparison at the Network Level
- Comparison at the State Level
- Comparison at the Route Level

Introduction

- MAP-21 & FAST Act legislations
 - Required FHWA to adopt pavement performance measures for evaluating condition of IHS and NHS
- Performance Measures:
 - Percentage of pavements on the IHS in good condition;
 - Percentage of pavements on the IHS in poor condition;
 - Percentage of pavements on the NHS in good condition; and
 - Percentage of pavements on the NHS in poor condition.

Introduction

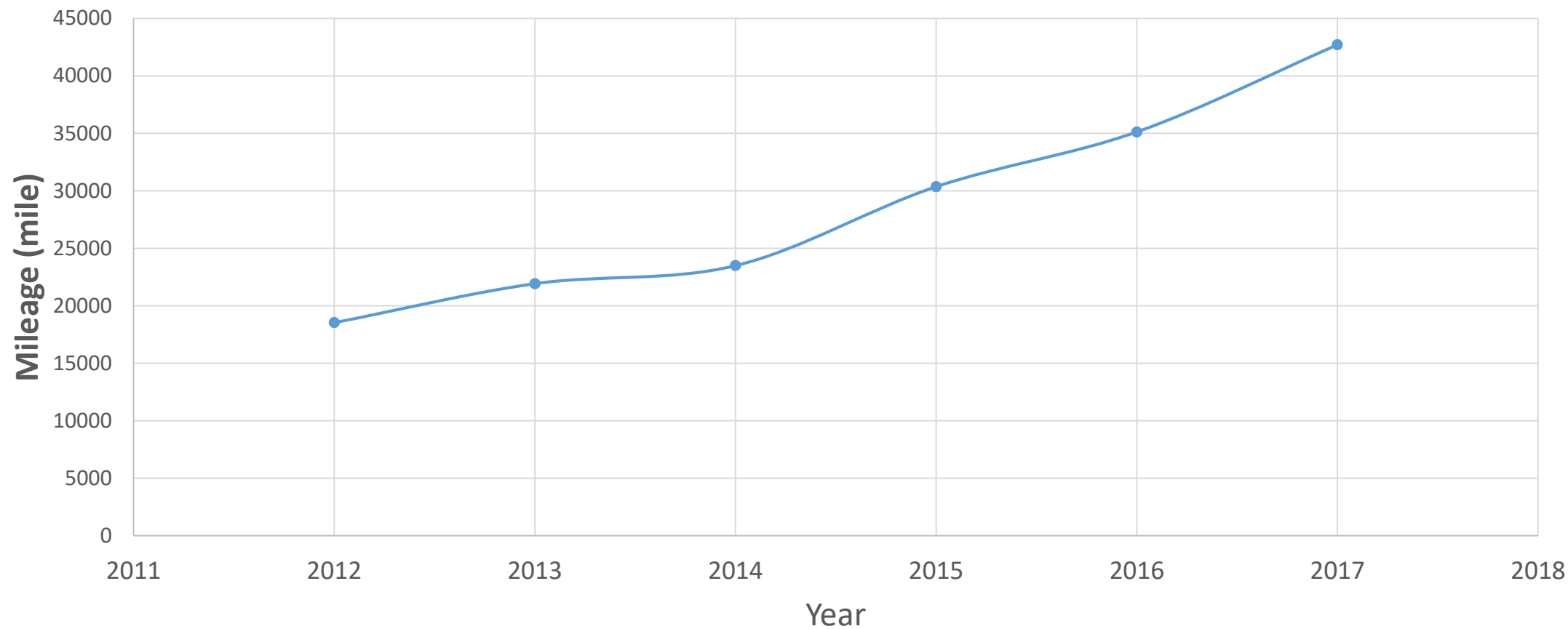
- Pavement condition data
 - HPMS dataset
- Condition Metrics:
 - Pavement roughness (IRI)
 - Cracking percent
 - Faulting
 - Rutting

Condition Metric	Performance Level	Threshold
IRI – All Pavements	Good	<95
	Fair	95-170
	Poor	>170
Percent Cracking, AC	Good	<5%
	Fair	5 – 20%
	Poor	>20%
Percent Cracking, CRCP	Good	<5%
	Fair	5 – 10%
	Poor	>10%
Percent Cracking, JCP	Good	<5%
	Fair	5 – 15%
	Poor	>15%
Rutting - AC	Good	<0.20
	Fair	0.20 – 0.40
	Poor	>0.40
Faulting - JCP	Good	<0.10
	Fair	0.10 – 0.15
	Poor	>0.15

Objectives

- Quality check of the HPMS data from 2012 to 2017
- Review the time series trends in the HPMS data

Sampled Mileage of HPMS Datasets



Quality Check of HPMS Datasets

- Consistency

Dataset	Faulting on Asphalt Pavements Rutting as NA	Rutting on Concrete Pavements Faulting as NA
HPMS 2012	0.9%	2%
HPMS 2013	0.1%	2%
HPMS 2014	1.6%	1%
HPMS 2015	0.1%	1.2%
HPMS 2016	0.5%	3.7%
HPMS 2017	0.1%	5%

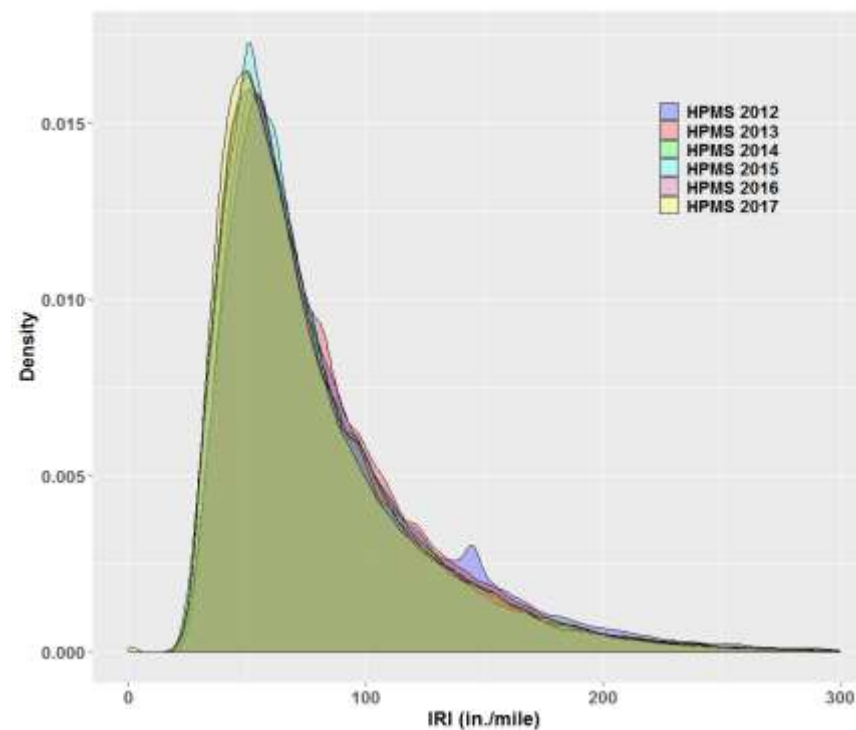
Quality Check of HPMS Datasets

- Surface Type

Dataset	NA or Unpaved	Dataset	NA or Unpaved
HPMS 2012	3%	HPMS 2015	32%
HPMS 2013	37%	HPMS 2016	16%
HPMS 2014	35%	HPMS 2017	0.08%

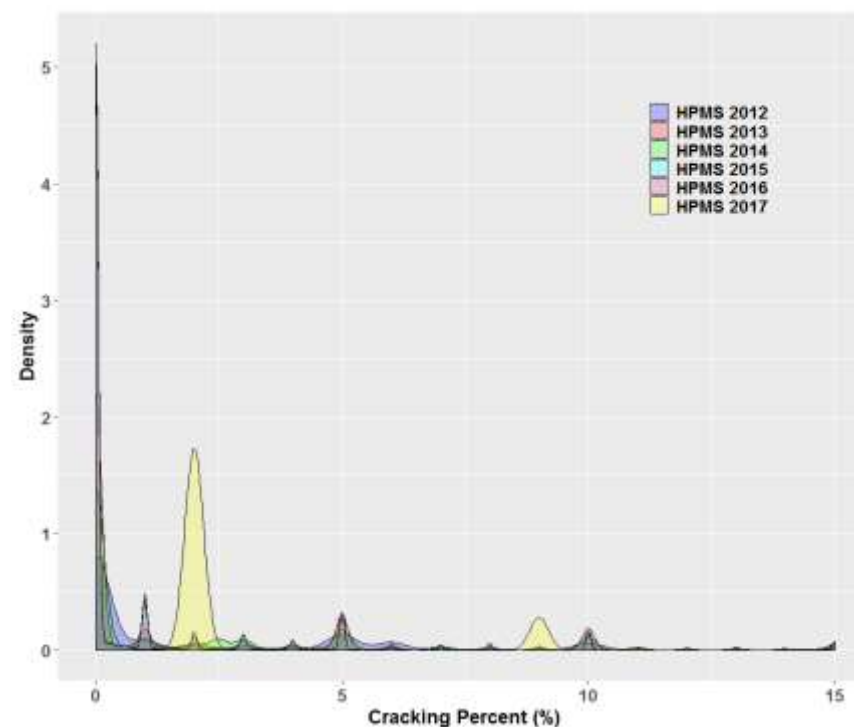
Condition Metrics – Network Level

Metric	Statistic	HPMS Data					
		2012	2013	2014	2015	2016	2017
IRI, in/mile	Mean	84	82	78	78	78	80
	Standard Deviation	47	44	41	42	43	44
	Min / Max	3 / >300	21 / >300	6 / >300	14 / >300	18 / >300	1 / >300



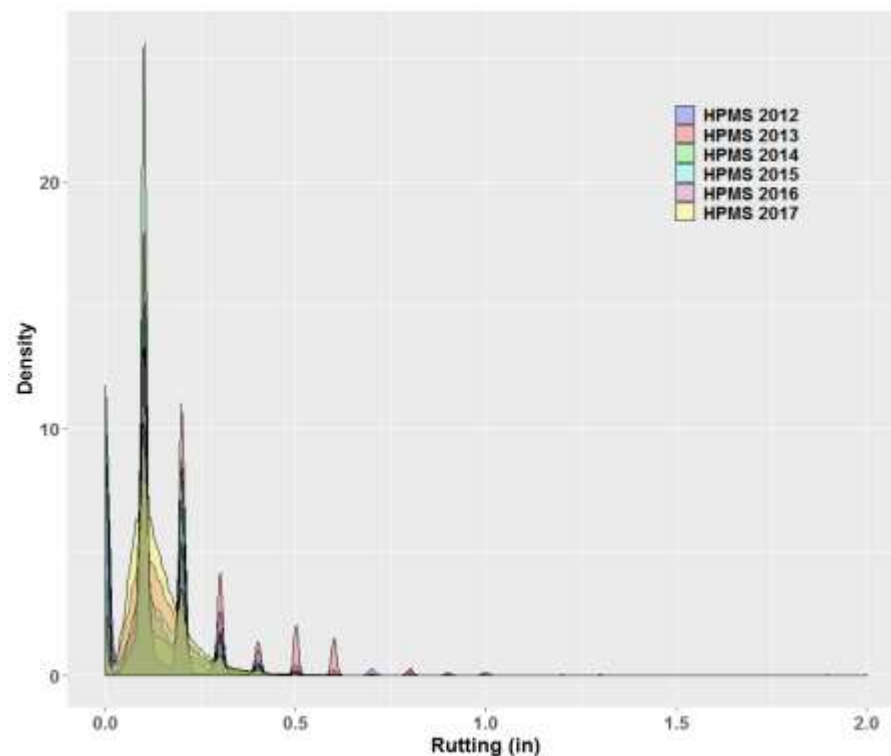
Condition Metrics – Network Level

Metric	Statistic	HPMS Data					
		2012	2013	2014	2015	2016	2017
Percent Cracking, %	Mean	4.8	8.2	5.3	3.4	3.4	3.4
	Standard Deviation	11.5	18.1	12.9	10.5	9.6	10.1
	Min / Max	0.0 / 100	0.0 / 100	0 / 100	0 / 100	0 / 100	0 / 100



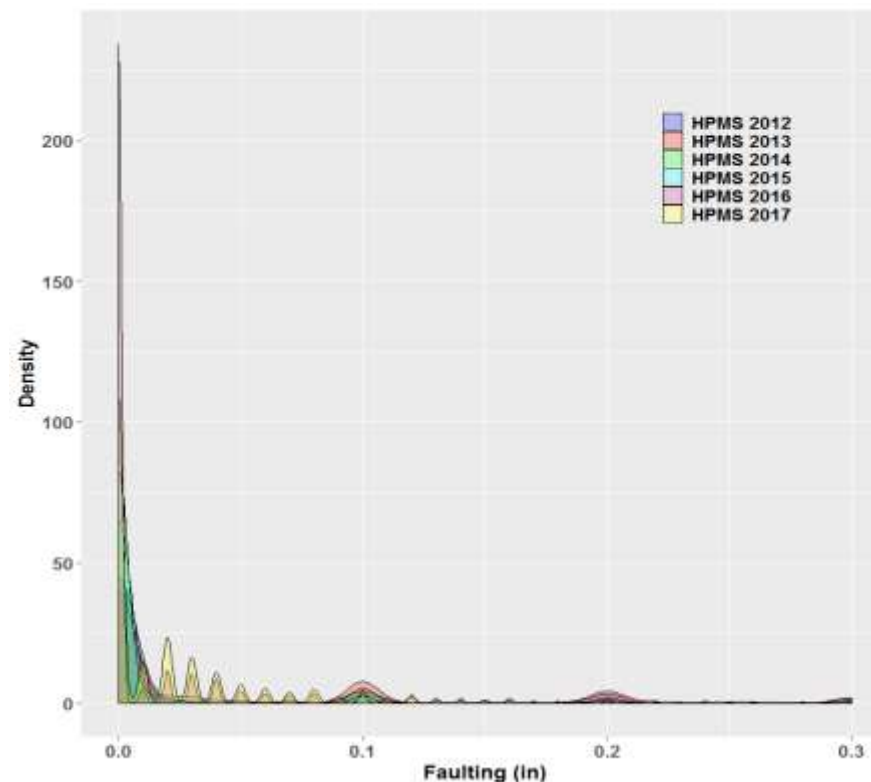
Condition Metrics – Network Level

Metric	Statistic	HPMS Data					
		2012	2013	2014	2015	2016	2017
Rut Depth, inch	Mean	0.19	0.25	0.13	0.13	0.13	0.14
	Standard Deviation	0.67	0.73	0.10	0.38	0.09	0.09
	Min / Max	0 / 16.1	0.0 / 16.9	0.0 / 1.77	-100 / 1.45	0 / 2.25	0 / 1.50

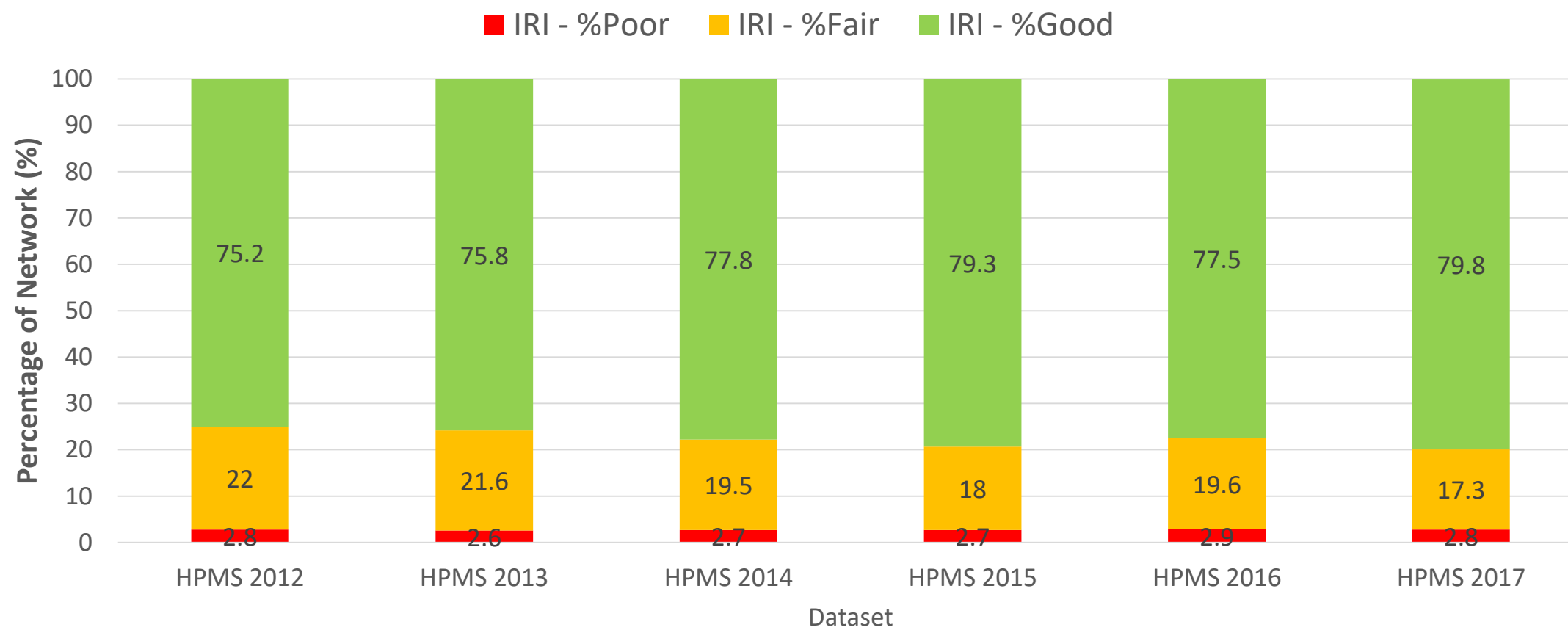


Condition Metrics – Network Level

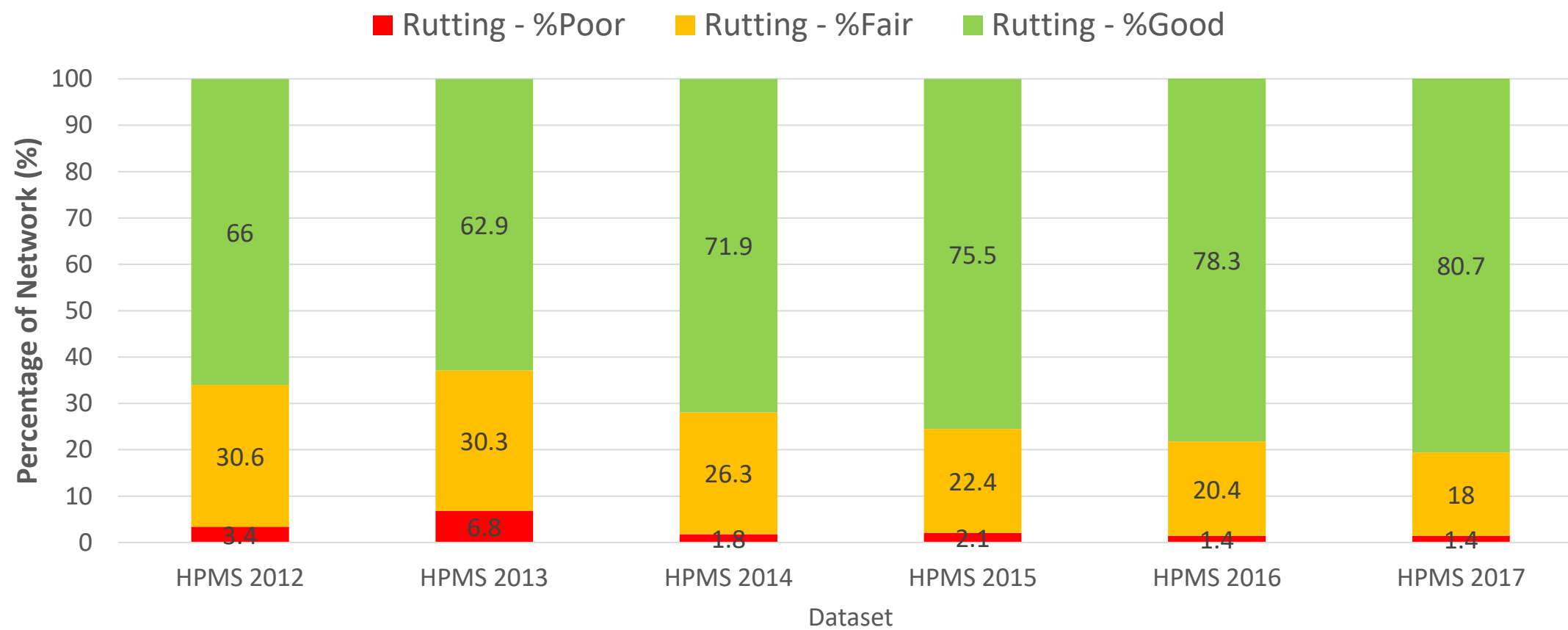
Metric	Statistic	HPMS Data					
		2012	2013	2014	2015	2016	2017
Faulting, inch	Mean	0.04	0.08	0.04	0.04	0.03	0.03
	Standard Deviation	0.15	0.16	0.15	0.10	0.10	0.05
	Min / Max	0 / 6.00	0 / 2.90	0 / 9.00	0 / 1.41	0 / 5.32	0 / 1.11



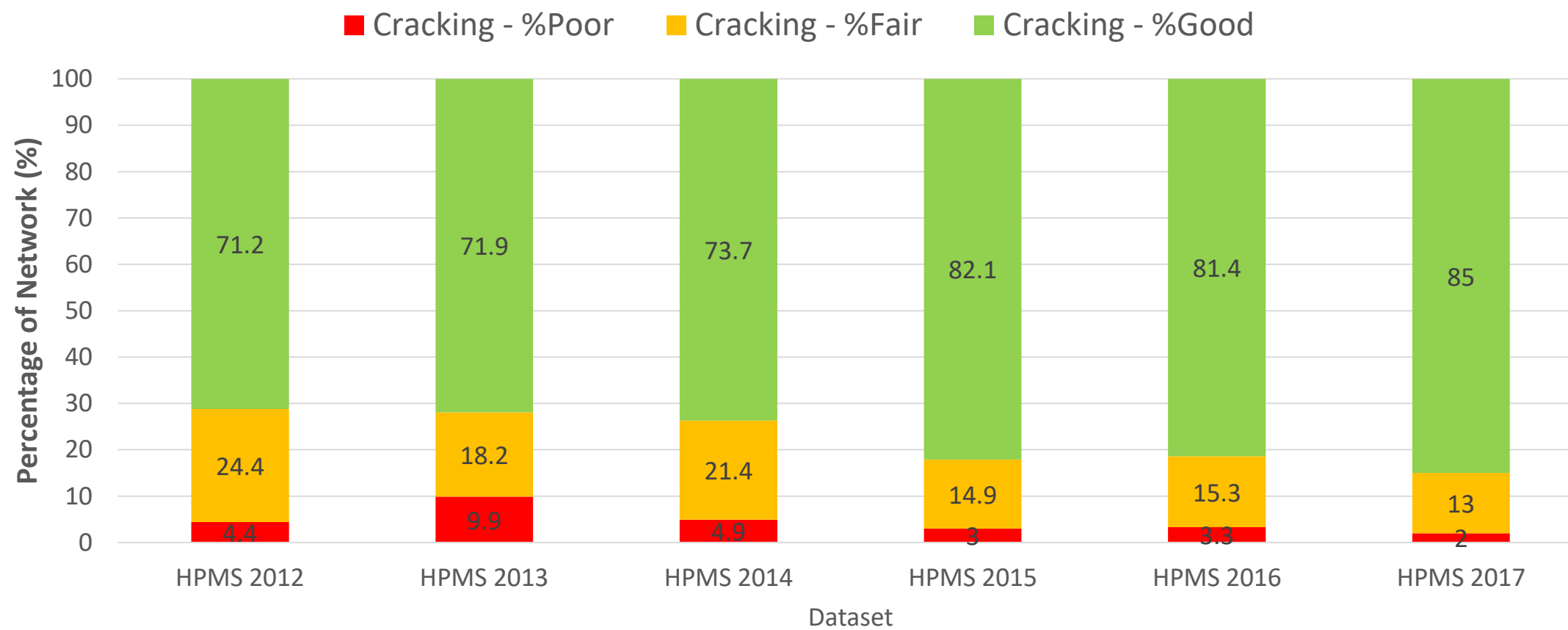
Condition Metrics – Network Level



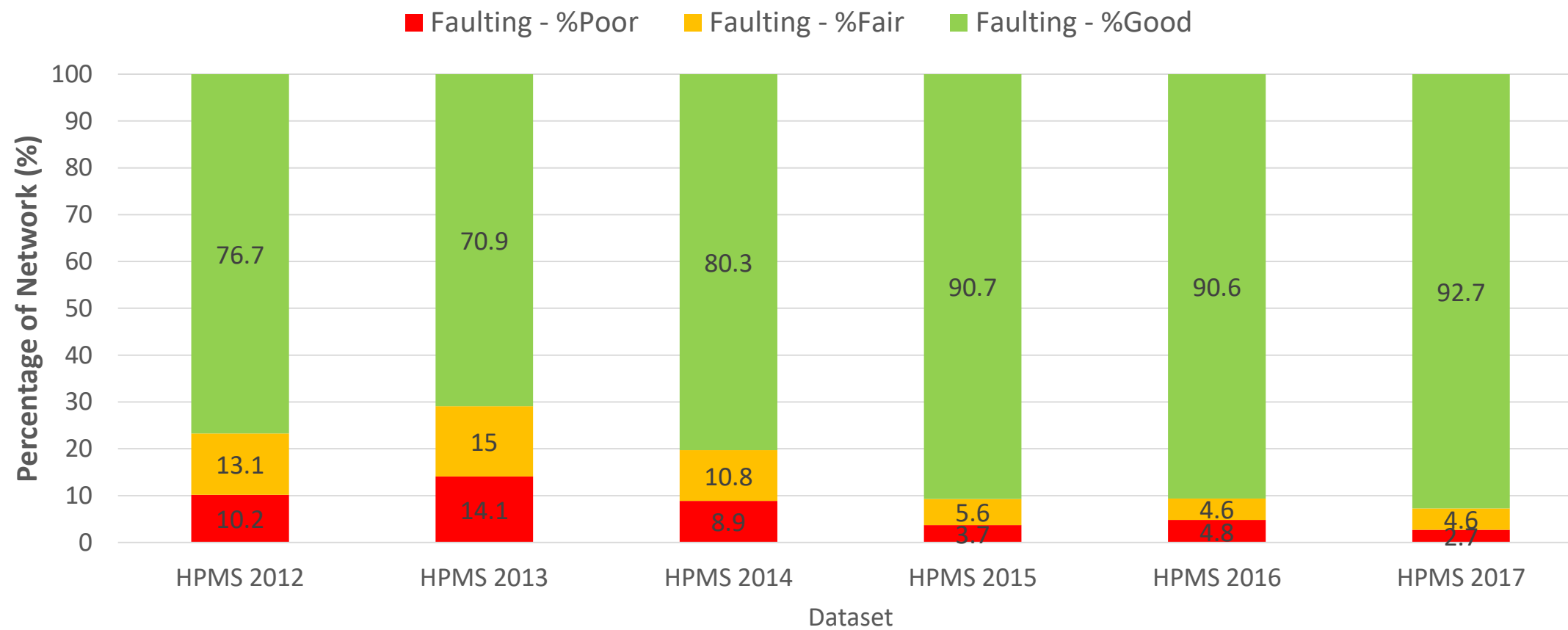
Condition Metrics – Network Level



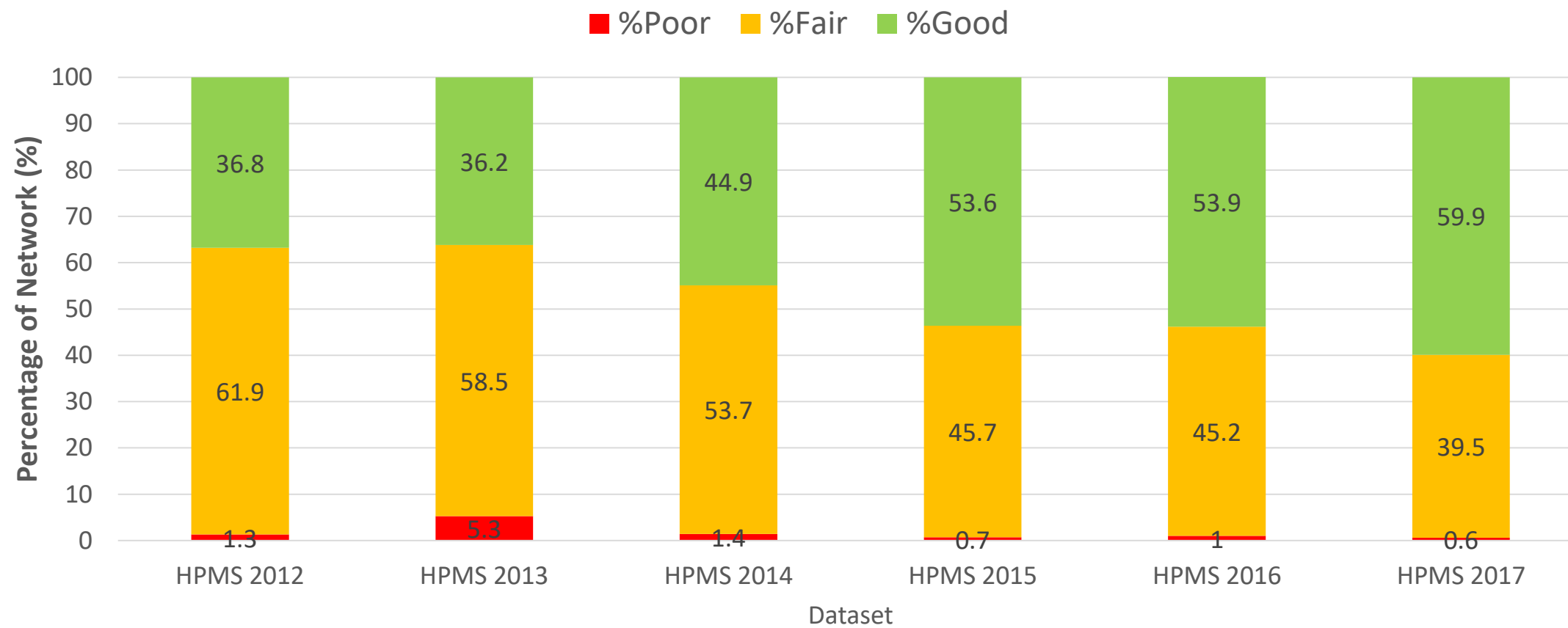
Condition Metrics – Network Level



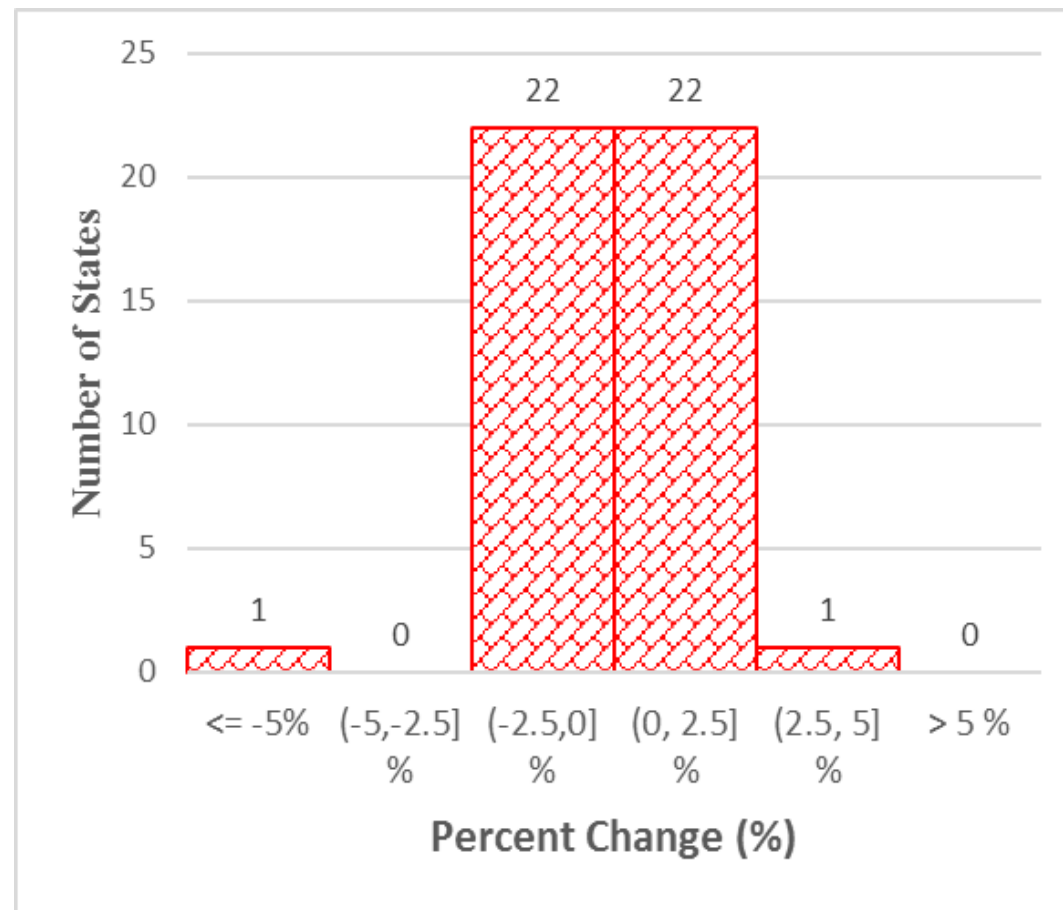
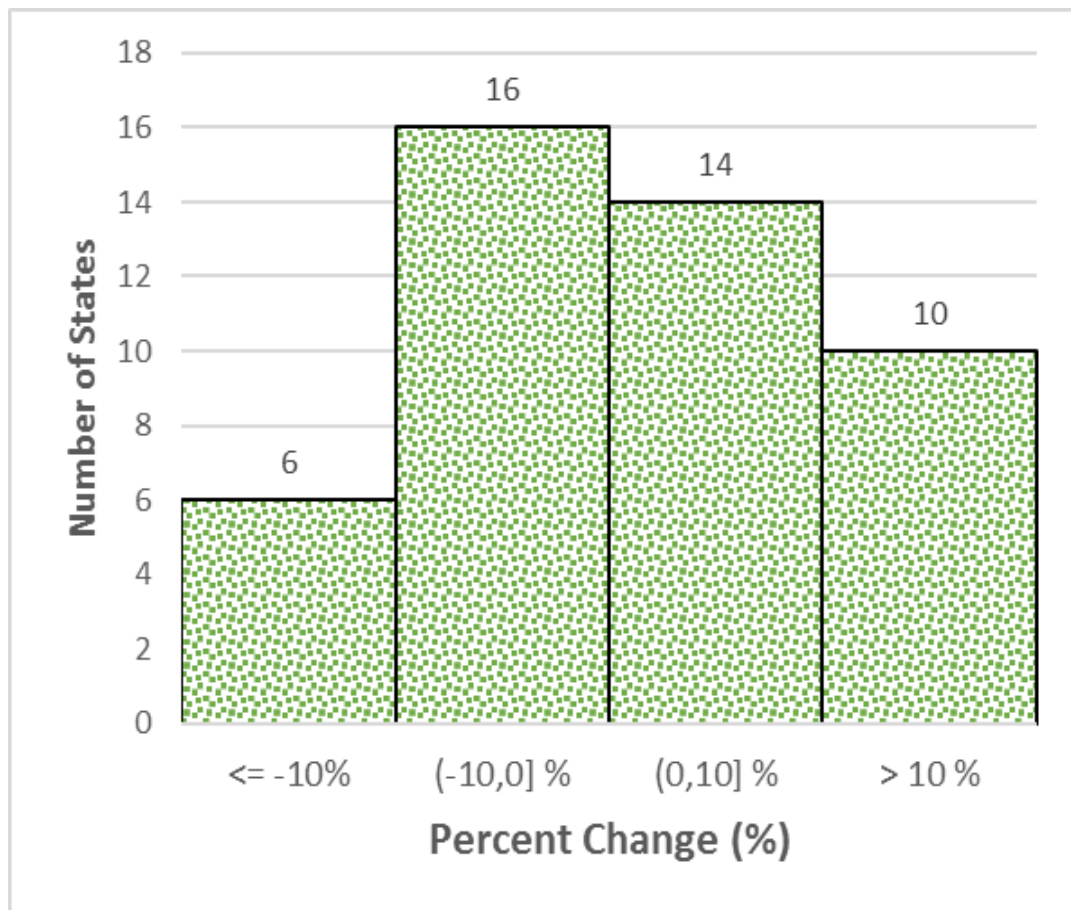
Condition Metrics – Network Level



Overall Conditions – Network Level

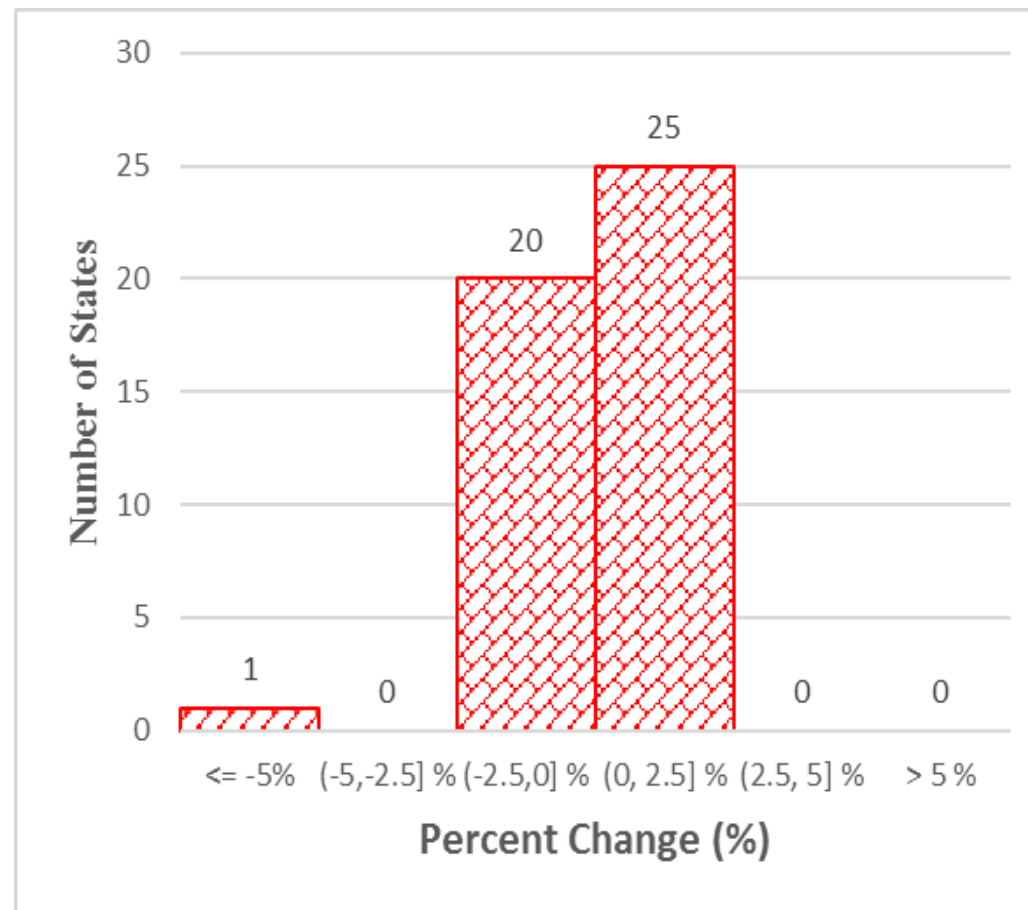
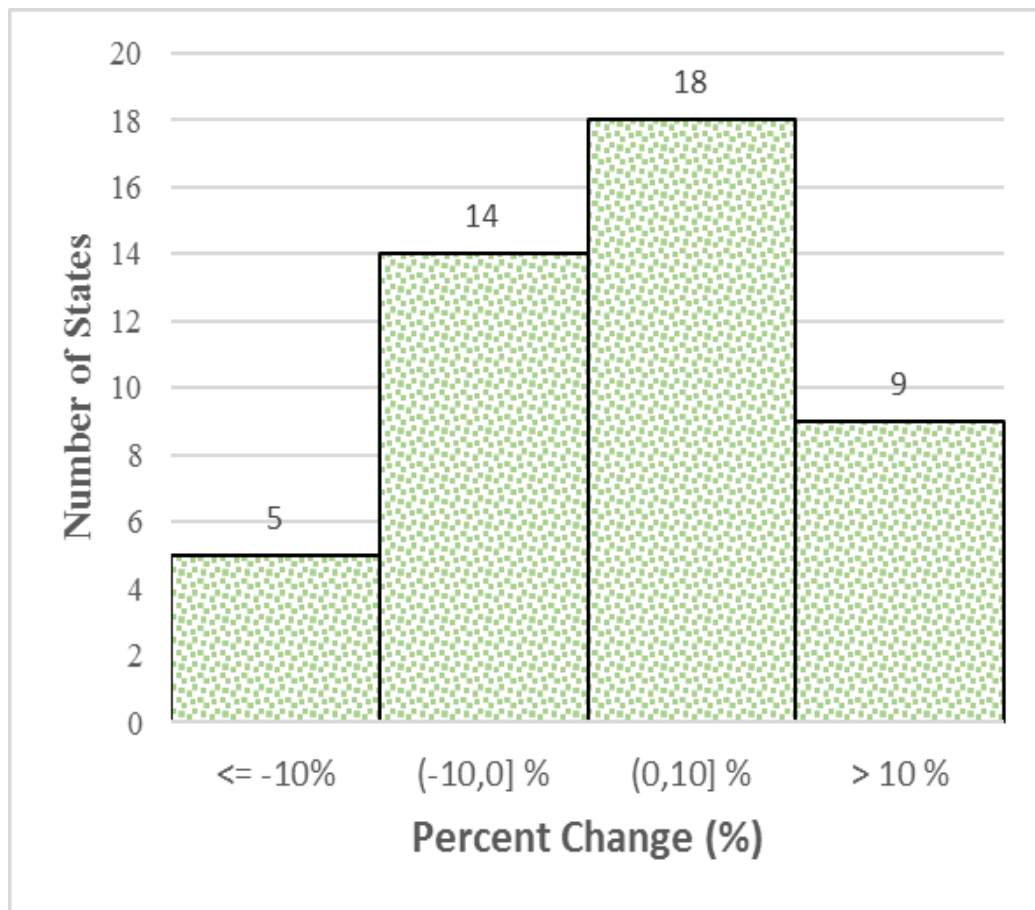


HPMS 2015 vs. 2016 – State Level



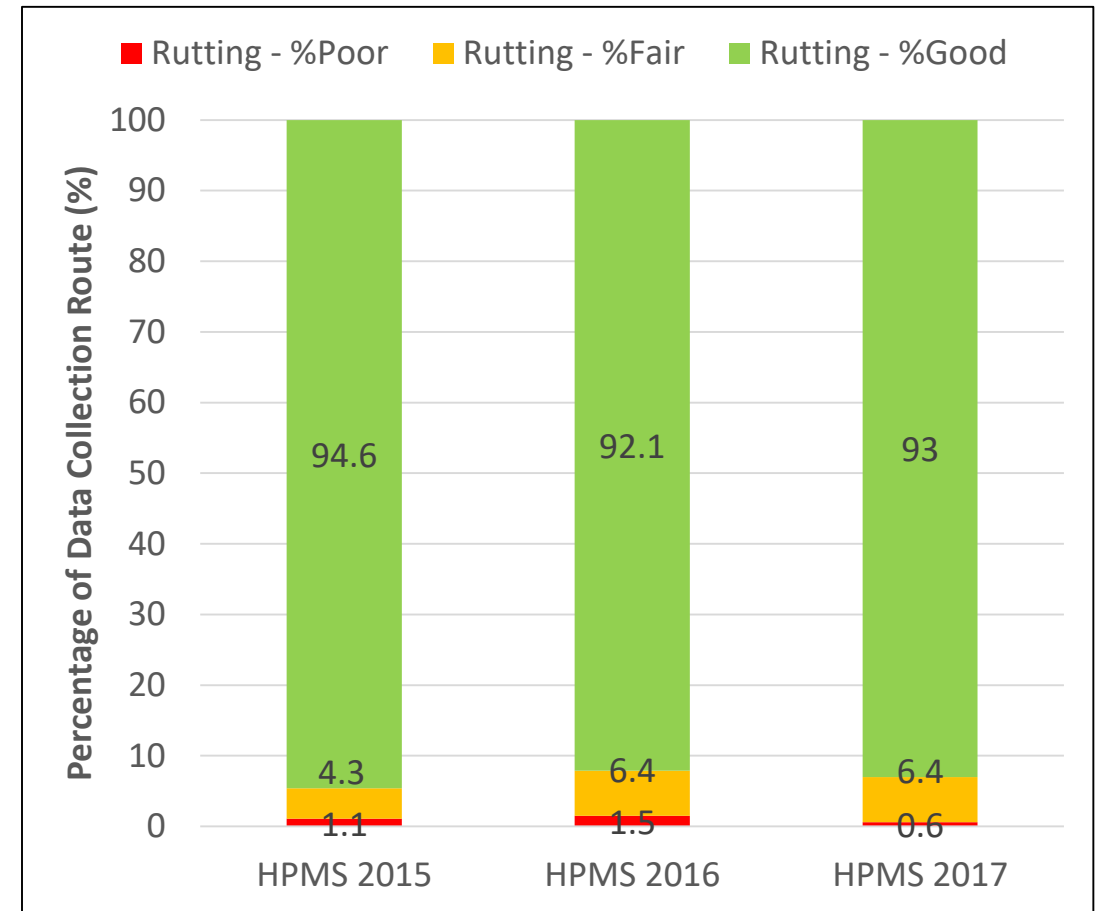
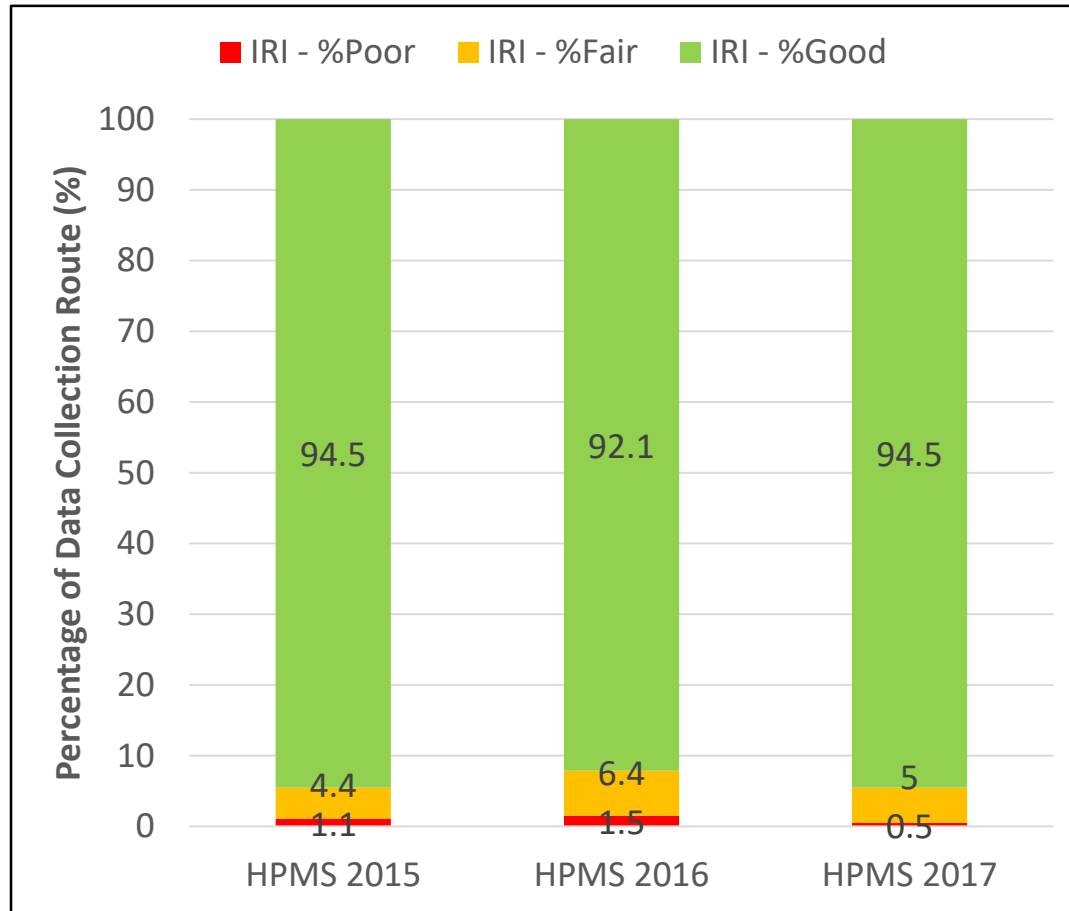
Percent Changes in Performance Measures from 2015 to 2016

HPMS 2016 vs. 2017 – State Level

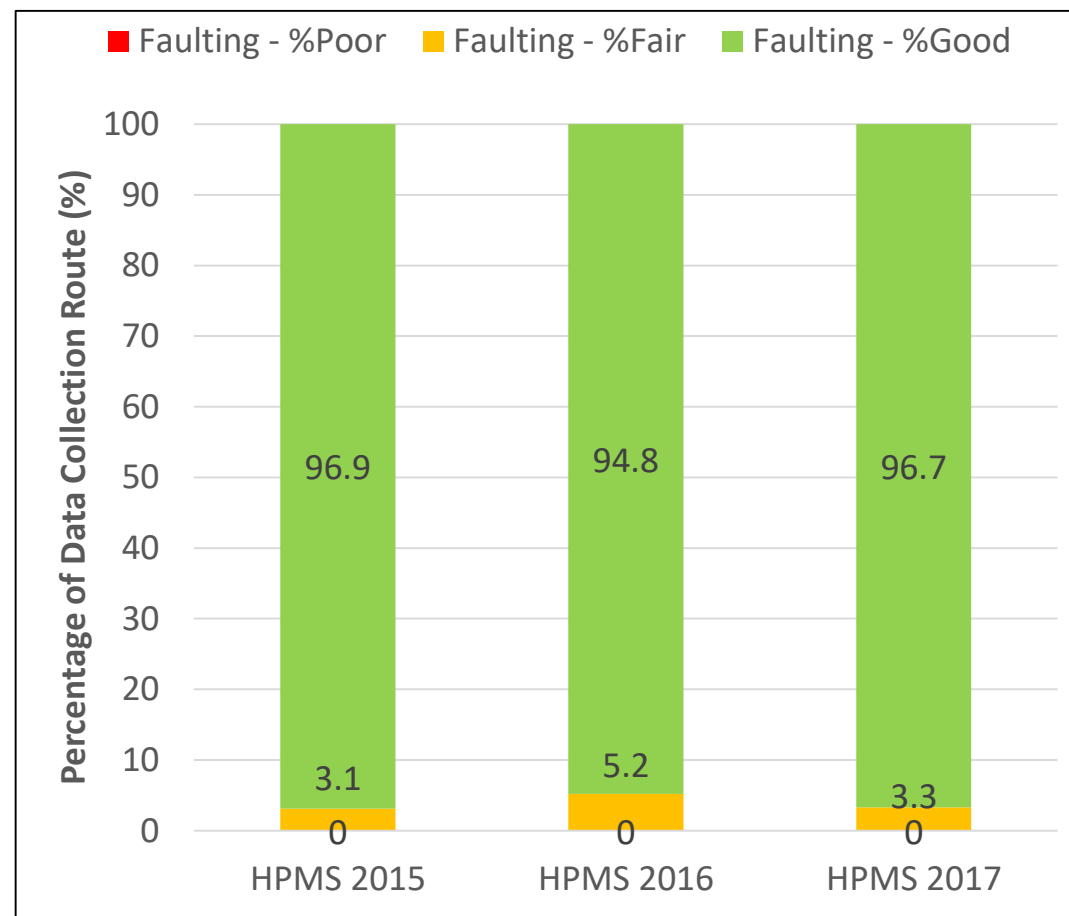
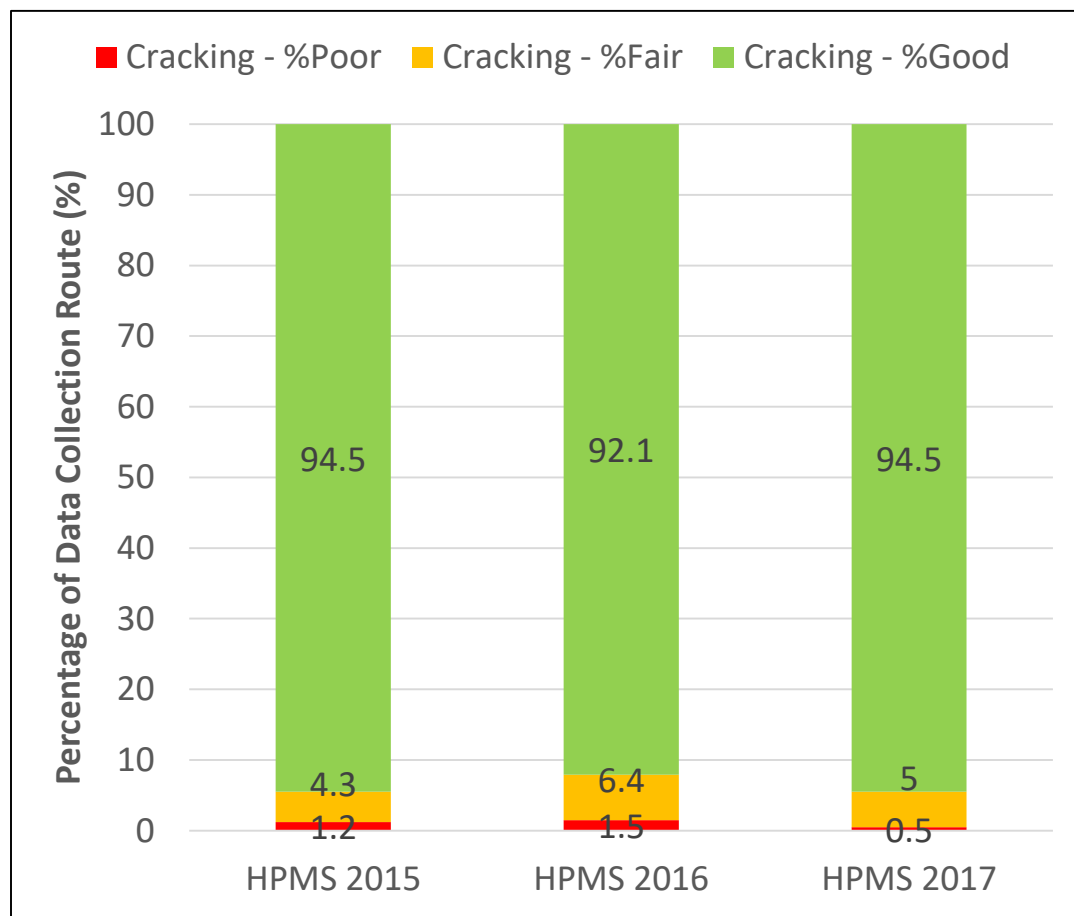


Percent Changes in Performance Measures from 2016 to 2017

Condition Metrics – Route Level



Condition Metrics – Route Level



Conclusions

Quality of data

- The quality of HPMS data appears to be improving.

Network – level

- The IRI and rutting distributions for the six datasets are nearly identical, but for cracking and faulting differences are observed in the distributions.
- The 2017 HPMS dataset has the highest percentage of pavement segments in “Good” condition and the lowest percentage in “Poor” condition at the overall condition level and most condition metrics.

Conclusions

State Level:

- About 52 percent of the States had an increase in the percentage of pavement segments in “Good” condition between 2015 and 2016, while 59 percent of the States had an increase between 2016 and 2017.

Route Level

- The four condition metrics have had little change over the three year period, from 2015 to 2017.

Thank you

