Florida Department of Environmental Protection

Office of Air Monitoring

Florida's Data Quality: An Overview

March 24, 2016

Overview

- Background on Quality Measurements and Objectives
- Importance of Assessing Data
- Benefits of Data Assessment
- Data Quality Report
- Florida's PQAO Challenges

Measurement Quality Objectives

Measurements are made in order to assess the quality of the data produced:

- One-point QC checks
- Flow rate verifications
- Performance audits

“Objectives” are acceptance criteria for quality attributes, usually dictated in the CFR, for rendering data for record to be of “good quality.”

Precision, Accuracy, and Bias

Precision Good
Accuracy Bad

Precision Bad
Accuracy Good

Precision Good
Accuracy Good

Bias distortion in one direction

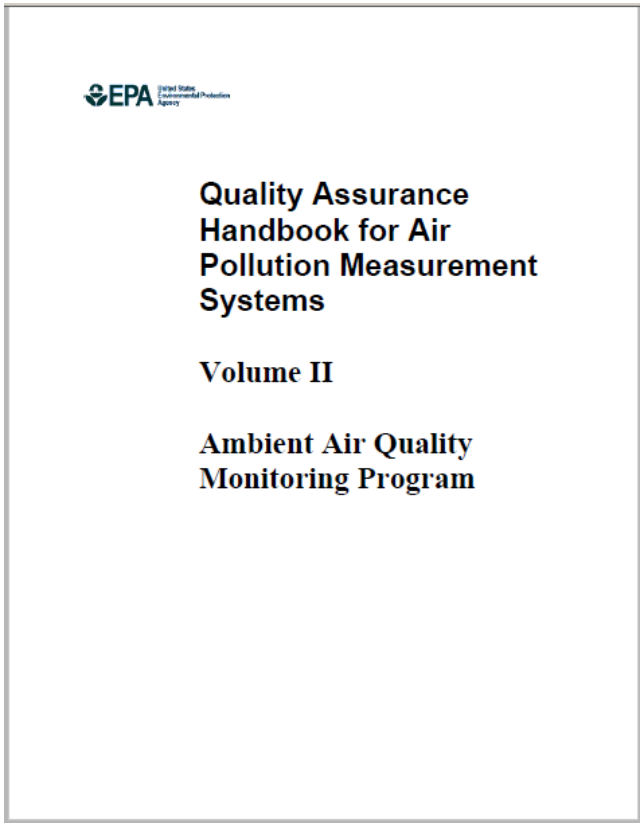
Tools for Assessing Precision

Pollutant	Precision	
	1-Point QC Checks	**Collocated Measurements**
Gaseous		
CO, NO_2, O_3, SO_2	✓	
Continuous		
$PM_{2.5}$		✓
PM_{10}		
Manual		
$PM_{2.5}$		✓
PM_{10} (high-volume)		✓
PM_{10} (low-volume)		✓

Tools for Assessing Accuracy/Bias

Pollutant	Accuracy/Bias		
	1-Point QC Checks	Flow Rate Verifications	Performance Audit
Gaseous			
CO, NO_2, O_3, SO_2	✓		✓
Continuous			
$PM_{2.5}$		✓	✓
PM_{10}		✓	✓
Manual			
$PM_{2.5}$		✓	✓
PM_{10} (high-volume)		✓	✓
PM_{10} (low-volume)		✓	✓

QA Handbook


EPA United States Environmental Protection Agency

Quality Assurance Handbook for Air Pollution Measurement Systems

Volume II

Ambient Air Quality Monitoring Program

Ozone Validation Template

1) Requirement (O_3)	2) Frequency	3) Acceptance Criteria	Information /Action
CRITICAL CRITERIA-OZONE			
One Point QC Check Single analyzer	*1/ 2 weeks*	≤ ±7% (percent difference)	1 and 2) 40 CFR Part 58 App A Sec 3.2 3) Recommendation based on DQO in 40 CFR Part 58 App A Sec 2.3.1.2. QC Check Conc range 0.01 - 0.10 ppm, relative to routine concentrations
Zero/span check	1/ 2 weeks	Zero drift ≤ ± 3.0 ppb (24 hr) ≤ ± 5.0 ppb (>24hr-14 day) Span drift ≤ ± 7 %	1 and 2) QA Handbook Volume 2 Section 12.3 3) Recommendation and related to DQO
OPERATIONAL CRITERIA -OZONE			
Shelter Temperature Range	Daily (hourly values)	20 to 30° C. (Hourly avg) or per manufacturers specifications if designated to a wider temperature range	1, 2 and 3) QA Handbook Volume 2 Section 7.2.2 Generally the 20-30 ° C range will apply but the most restrictive operable range of the instruments in the shelter may also be used as guidance. FRM/FEM list found on AMTIC provides temp. range for given instrument. FRM/FEM monitor testing is required at 20-30 ° C range
SYSTEMATIC CRITERIA-OZONE			
Sampler/Monitor/ Transfer and Calibration Standard	NA	*Meets requirements listed in FRM/FEM designation*	1) 40 CFR Part 58 App C Section 2.1 2) NA 3) 40 CFR Part 53 & FRM/FEM method list
Standard Reporting Units	*All data*	*ppm (final units in AQS)*	1, 2 and 3) 40 CFR Part 50 App I sec 2.1.1
Rounding convention for data reported to AQS	*All data*	*3 places after decimal with digits to right truncated*	1, 2 and 3) 40 CFR Part 50 App I sec 2.1.1
	3-Year Comparison	*≥ 90% (avg) daily max available in ozone season with min of 75% in any one year.*	1) 40 CFR Part 50 App I 2) 40 CFR Part 50 App I Section 2.3

Pink - Critical Criteria
Yellow - Operational Criteria
Blue - Systematic Criteria

Why Assess Data Quality?

- Required for NAAQS standard
- Identifies and corrects deficiencies to prevent recurrence
- Strengthens defensibility of decisions
- Reviews required practices and policies
- Exemplifies an independent verification
- Determines data credibility
- Proves data integrity
- Confirms data completeness

Benefits of Assessment

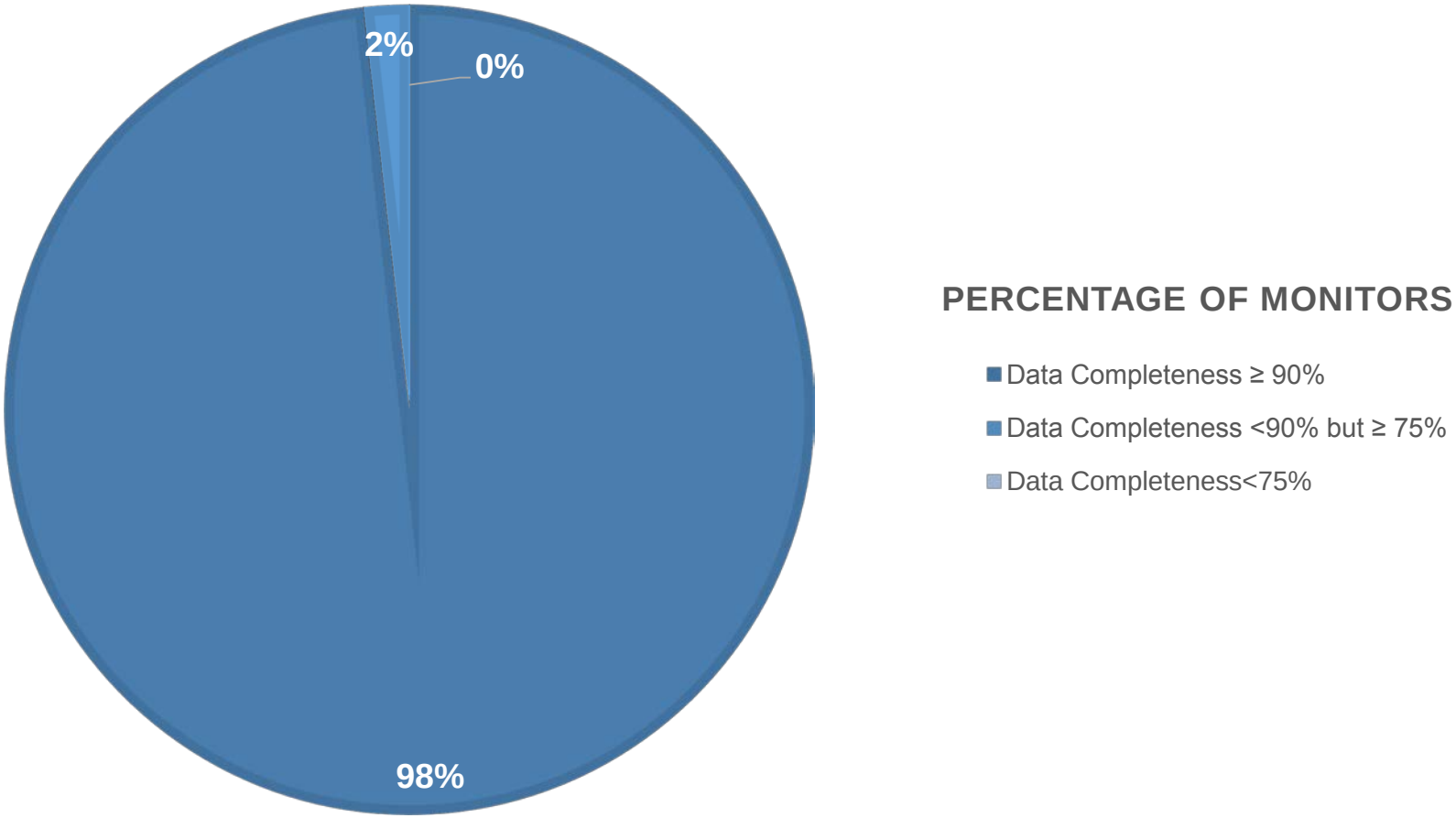
- Promotes consistency within the PQAO
- Enhances attention to data quality and data collection process
- Helps all involved improve their understanding of their roles and responsibilities
- Reduces possibility of legal challenges

Ozone Data Reporting Requirement

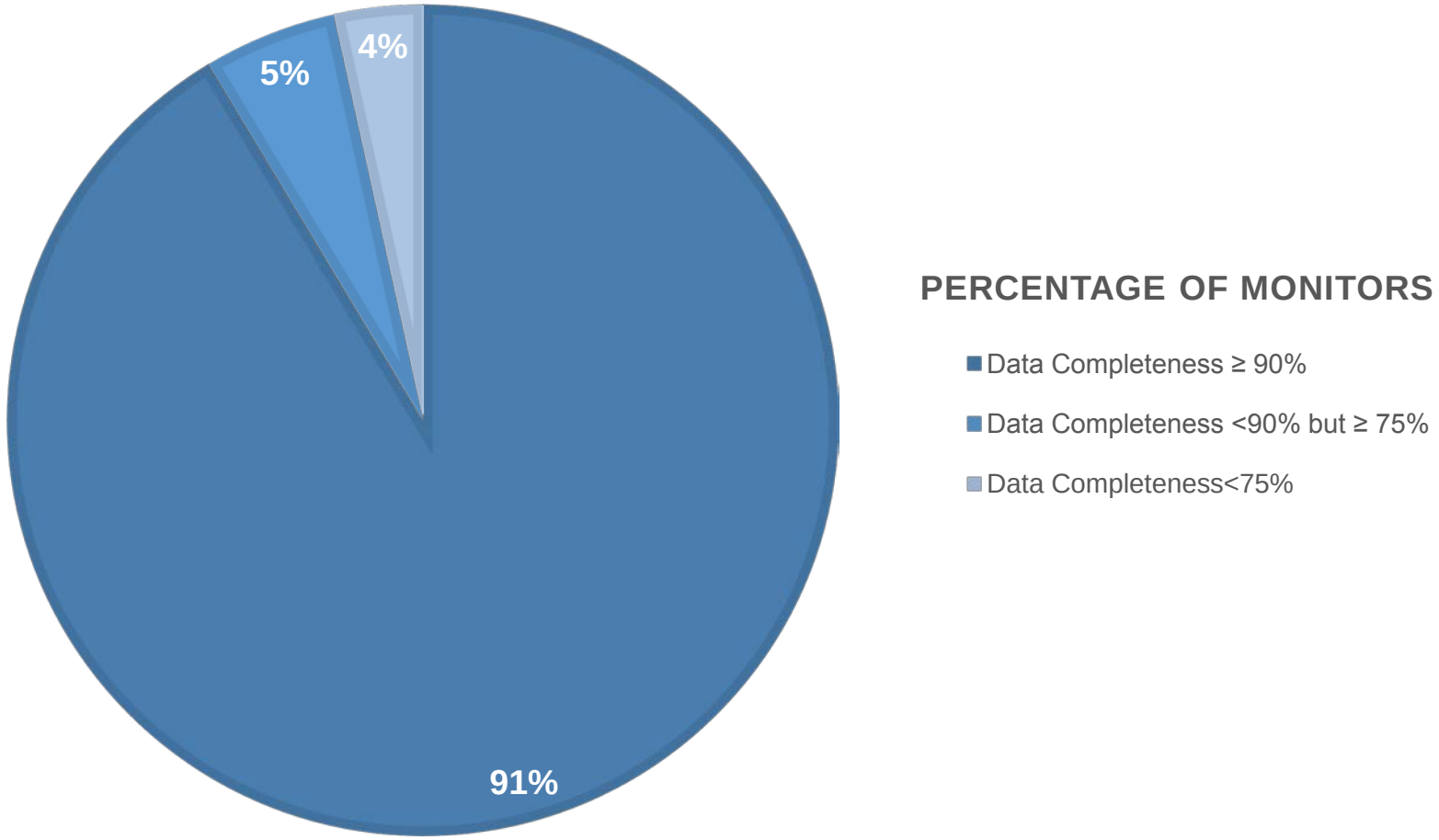
"This comparison shall be based on three consecutive, complete calendar years of air quality monitoring data. This requirement is met for the 3-year period at a monitoring site if daily maximum 8-hour average concentrations are available for at least 90% of the days within the O_3 monitoring season, on average, for the 3-year period, with a minimum data completeness requirement in any one year of at least 75% of the days within the O_3 monitoring season."

-40 CFR Part 50, Appendix P

Florida PQAO Ozone Data Completeness - 2014



Florida PQAO Ozone Data Completeness - 2015

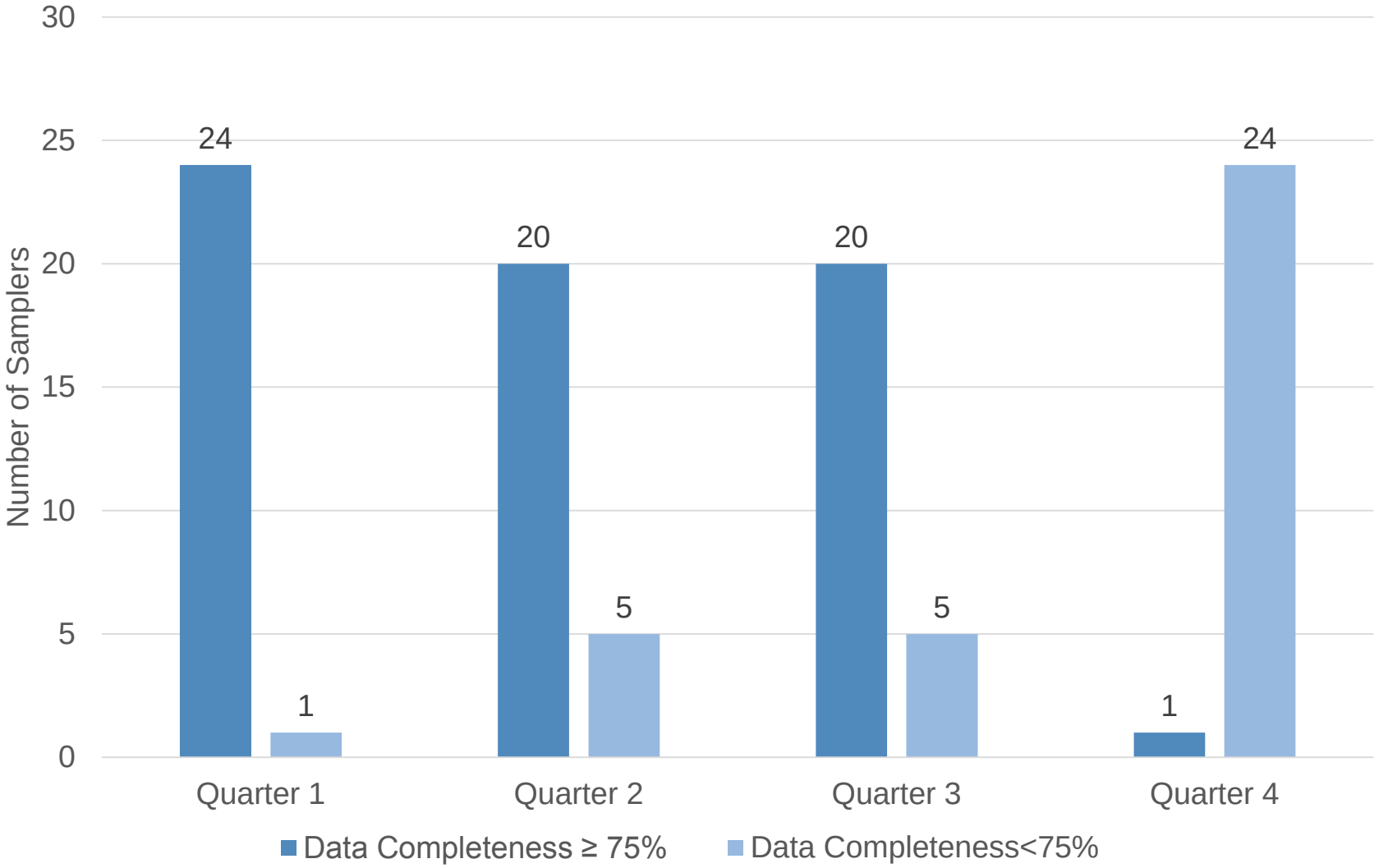


$PM_{2.5}$ Data Reporting Requirement

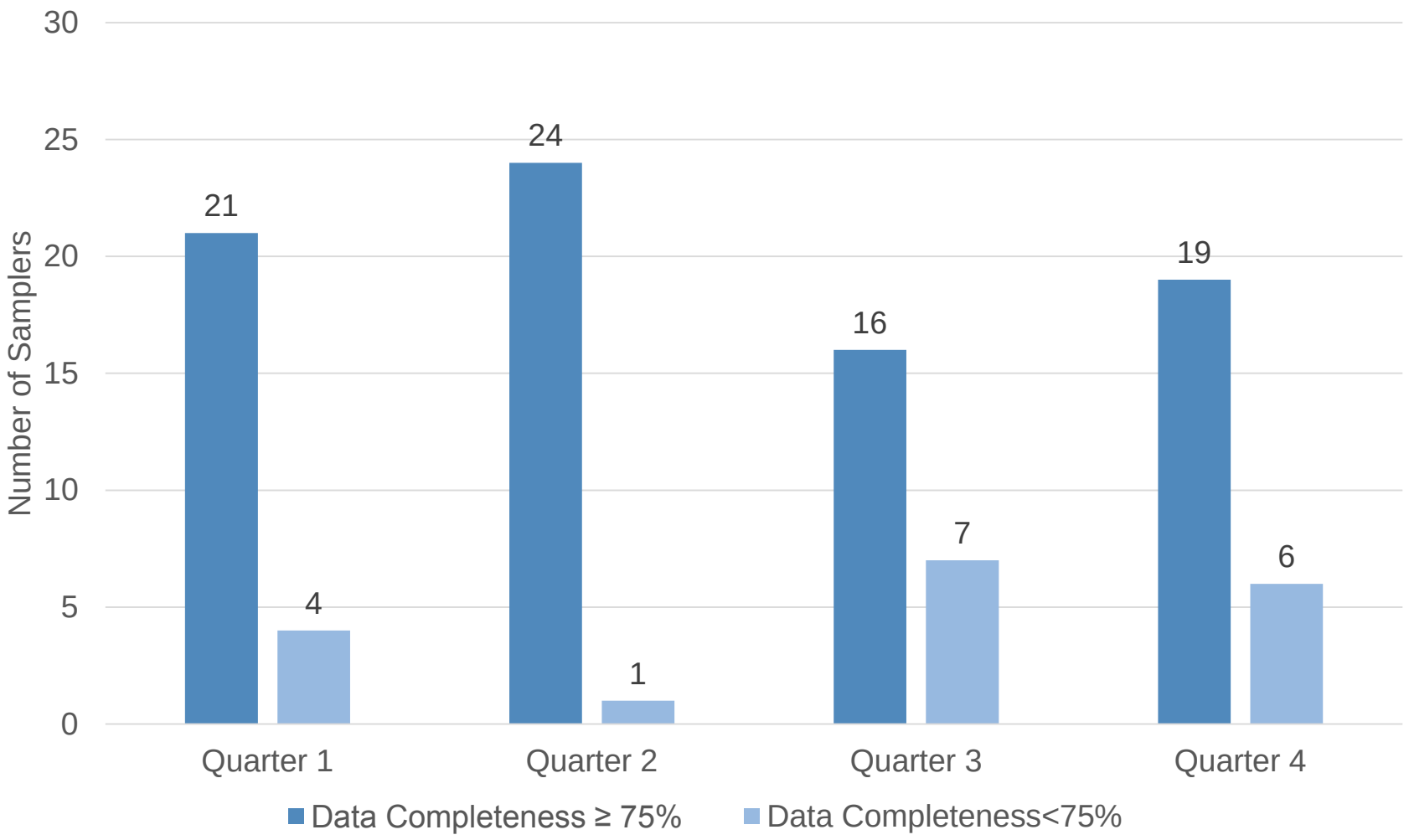
"Three years of valid annual means are required to produce a valid annual $PM_{2.5}$ NAAQS design value. A year meets data completeness requirements when quarterly data capture rates for all four quarters are at least 75 percent."

-40 CFR Part 50, Appendix N

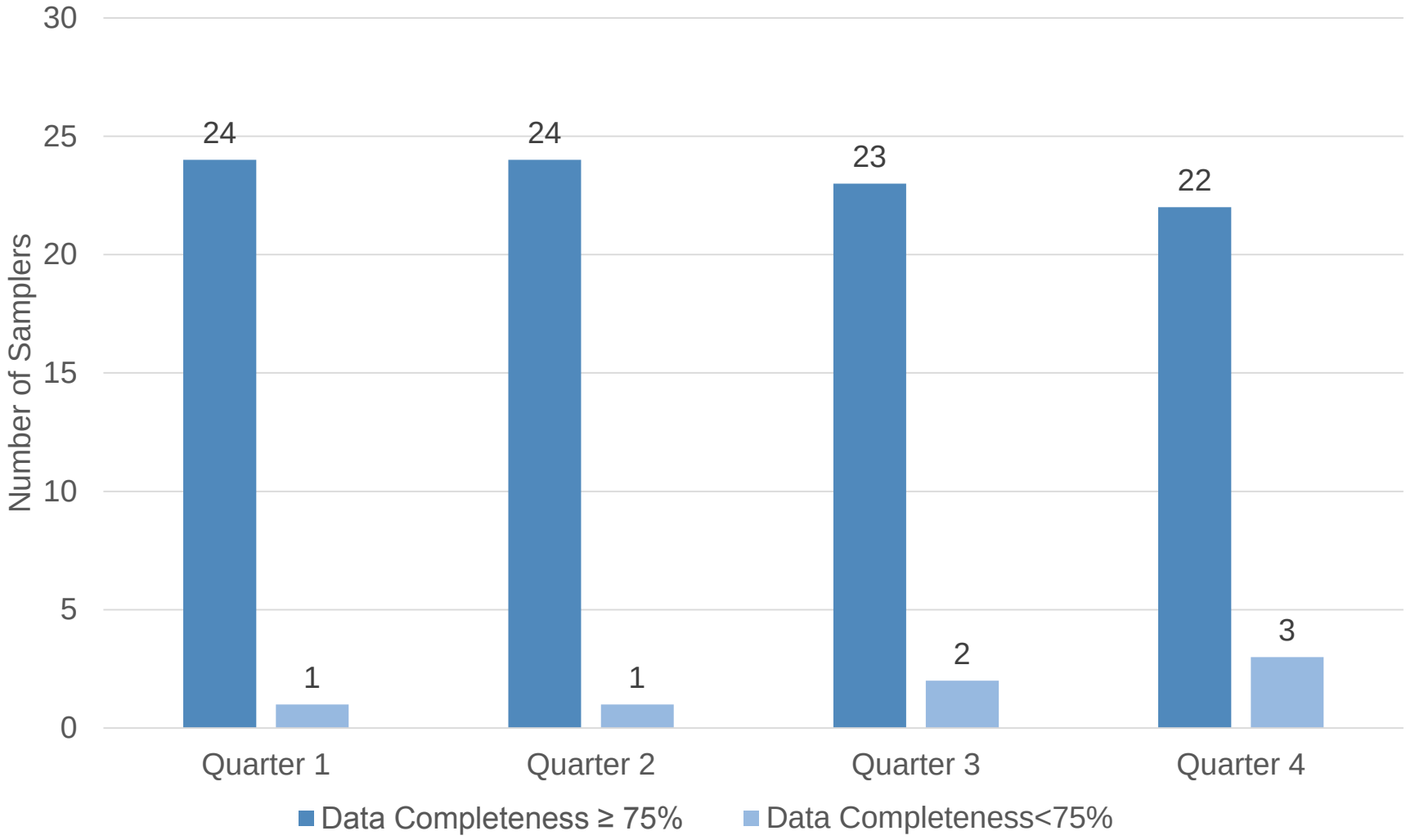
Florida PQAO $PM_{2.5}$ FRM Data Completeness - 2013



Florida PQAO $PM_{2.5}$ FRM Data Completeness - 2014



Florida PQAO $PM_{2.5}$ FRM Data Completeness - 2015



PQAO Challenges

- Ensuring data are an accurate reflection of network
- Correcting coding (i.e. parameter codes, method codes, etc.)
- Timely reporting of corrections to Florida DEP
- Ensuring field operators are following SOPs and associated data handling procedures
- Confirming that SOPs, QAPPs, and other QA documents include the appropriate critical criteria
- Ensuring that data are handled consistently statewide

Looking Ahead

- AQS training and corrections
- Provide timely data quality reviews
- Continue to monitor quarterly data completeness to track trends and identify possible data quality issues
- Routine periodic reviews of QA documents
- Field proficiency checks
- Increased automated checks

Questions?

Cadedra Hodge

Cadedra.Hodge@dep.state.fl.us

850-717-9014