

Table 1. 2024 Data Collection Statistics.

National Park Service Gaseous Pollutant Monitoring Program

National Park Unit	Site Name	Parameter % Valid											
		O3	SO2	CO	NOX	PM2.5	WD	WS	TMP	RH	RNF	SOL	FLOW
Big Bend	K-Bar Ranch Road	83.3	---	---	---	---	84.1	84.1	84.2	84.2	---	---	91.6
Canyonlands	Island in the Sky	94.7	---	---	---	---	91.3	91.3	91.4	91.5	---	---	96.4
Carlsbad Caverns	Biology Building	95.6	---	---	---	---	95.4	95.4	99.8	96.2	---	---	---
Chaco Culture	Radio Repeater	93.1	---	---	83.0	---	98.9	98.9	99.4	99.4	---	---	---
Chiricahua	Entrance Station	99.1	---	---	---	---	99.7	99.7	99.7	99.7	99.5	99.7	99.9
Craters of the Moon	Visitor Center	95.1	---	---	---	---	99.1	99.1	99.2	---	---	---	---
Death Valley	Park Village	97.3	---	---	---	---	98.4	98.4	98.4	---	---	---	---
Denali	Headquarters	99.0	---	---	---	---	86.6	86.6	99.3	99.9	99.9	99.6	99.3
Dinosaur	West Entrance Housing	97.3	---	---	---	---	99.7	99.7	99.7	---	85.3	100.0	99.5
Everglades	Beard Center	---	---	---	---	---	---	---	---	---	---	---	99.9
Glacier	West Glacier Horse Stables	98.3	---	---	---	---	98.9	98.9	99.5	---	---	---	97.4
Grand Canyon	The Abyss	93.8	---	---	---	---	86.9	99.5	99.7	82.1	---	---	95.4
Grand Teton	Science School	96.5	---	---	---	---	99.7	99.7	99.7	99.7	---	---	---
Great Basin	Maintenance Yard	98.9	---	---	---	---	99.2	99.2	97.9	97.9	---	---	99.2
Great Smoky Mountains	Cades Cove	92.9	---	---	---	---	83.0	98.5	98.7	98.7	98.3	98.7	---
Great Smoky Mountains	Cove Mountain	99.0	---	---	---	---	98.9	98.9	97.9	99.0	88.8	---	---
Great Smoky Mountains	Kuwahohi (Clingmans Dome)	89.7	---	---	---	---	97.5	97.5	94.5	91.7	97.6	97.8	---
Great Smoky Mountains	Look Rock	98.4	---	---	---	91.5	99.1	99.1	99.6	99.2	99.4	99.7	99.3
Great Smoky Mountains	Look Rock (NCore)	---	91.8	74.5	---	---	---	---	---	---	---	---	---
Hawaii Volcanoes	Visitor Center	---	92.6	---	---	85.9	99.4	99.4	99.5	99.5	---	---	---
Joshua Tree	Black Rock	95.7	---	---	---	---	99.8	99.8	99.7	99.9	---	---	99.4
Joshua Tree	Cottonwood Visitor Center	98.9	---	---	---	---	99.7	99.7	99.9	99.9	99.9	100.0	---
Lassen Volcanic	Manzanita Lake Fire Station	78.6	---	---	---	---	94.7	94.7	47.4	79.4	---	---	91.7
Mammoth Cave	Houchin Meadow	94.6	---	---	---	---	99.9	99.9	99.9	97.2	---	---	99.7
Mesa Verde	Resource Management Area	90.6	---	---	---	---	98.7	98.7	99.0	99.0	---	---	98.9
Pinnacles	SW of East Entrance Station	96.4	---	---	---	---	97.0	97.0	97.5	97.5	---	---	97.1
Rocky Mountain	Longs Peak	99.1	---	---	---	---	99.8	99.8	99.8	99.8	---	---	99.3
Sequoia and Kings Canyon	Ash Mountain	96.5	---	---	---	94.9	98.0	98.0	98.0	98.0	---	---	97.2
Sequoia and Kings Canyon	Lower Kaweah	98.6	---	---	---	---	96.1	96.1	98.9	98.7	---	---	---
Shenandoah	Big Meadows	95.2	---	---	---	---	95.2	95.2	89.2	89.2	---	---	90.3
Voyageurs	Sullivan Bay	82.8	---	---	---	---	67.5	97.8	98.0	98.1	---	---	88.3
Yellowstone	Old Faithful Snow Lodge	---	---	86.9	94.2	96.0	99.5	99.5	99.7	99.7	---	---	---

Table 1. 2024 Data Collection Statistics (continued).
National Park Service Gaseous Pollutant Monitoring Program

National Park Unit	Site Name	Parameter % Valid											
		O3	SO2	CO	NOX	PM2.5	WD	WS	TMP	RH	RNF	SOL	FLOW
Yellowstone	Water Tank	99.1	---	---	---	---	99.7	99.7	99.7	99.7	---	---	99.2
Yellowstone	West Entrance	---	---	81.2	93.8	95.0	99.3	99.3	99.8	99.8	---	---	---
Yosemite	Turtleback Dome	99.3	---	---	---	---	99.2	99.2	99.8	99.8	---	---	99.5
Zion	Dalton's Wash	99.0	---	---	---	---	99.8	99.8	99.7	---	---	---	---
Average Network Data Collection		95.0	92.2	80.9	90.3	92.7	95.9	97.6	96.6	96.4	96.1	99.4	97.1

Key:

O3 = Ozone
 SO2 = Sulfur Dioxide
 CO = Carbon Monoxide
 NOX = Oxides of Nitrogen

PM2.5 = Particulate Matter 2.5
 WD = Wind Direction
 WS = Wind Speed
 TMP = Temperature

RH = Relative Humidity
 RNF = Precipitation
 SOL = Solar Radiation
 FLOW = Filter Pack Flow Rate

Performance Goals:

Quarterly Criteria:
 100% of sites, >= 85% valid data capture
 90% of sites, >= 90% valid data capture
 80% of sites, >= 95% valid data capture

Monthly Criteria:
 100% of sites, >= 60% valid data capture
 90% of sites, >= 75% valid data capture
 80% of sites, >= 85% valid data capture

Font color key:

Black: 85% - 100% data recovery
 Blue: 75% - 84.9% data recovery
 Orange: 60% - 74.9% data recovery
 Red: 0% - 59.9% data recovery

Table 2. 2024 Ozone Analyzer Precision and Accuracy Summary.

National Park Service Gaseous Pollutant Monitoring Program

National Park Unit	Site Name	Calendar Quarter	Precision				Accuracy		
			Required No. of Precision Checks Met? ¹	Avg. Absolute Percent Difference ^{3,4}	Lower 95% Probability Limit ⁶	Upper 95% Probability Limit ⁶	Accuracy Check Performed During the Quarter? ²	Avg. Absolute Percent Difference ^{3,4}	Max. Absolute Percent Difference ⁵
Big Bend	K-Bar Ranch Road	1	Y	0.6	-4.0	2.8	N	---	---
		2	Y	1.2	-5.1	2.8	Y	3.6	4.9
		3	N	1.5	-7.5	4.6	N	---	---
		4	Y	3.1	1.1	5.2	Y	5.3	6.6
Canyonlands	Island in the Sky	1	Y	0.6	-1.3	0.2	Y	1.1	2.0
		2	Y	1.1	-2.7	0.6	N	---	---
		3	Y	2.1	-4.3	0.1	Y	0.7	1.5
		4	Y	0.1	-1.2	1.1	N	---	---
Carlsbad Caverns	Biology Building	1	Y	1.4	0.5	2.2	N	---	---
		2	Y	0.3	-1.2	1.9	Y	0.9	1.4
		3	Y	1.0	-2.0	0.0	N	---	---
		4	N	0.4	-1.1	1.8	Y	0.3	0.4
Chaco Culture	Radio Repeater	1	Y	0.5	-0.5	1.6	Y	0.5	1.5
		2	Y	0.5	-1.9	0.9	Y	1.3	2.2
		3	Y	0.4	-1.5	0.8	Y	2.0	2.9
		4	Y	0.4	-1.4	2.3	Y	0.3	0.5
Chiricahua	Entrance Station	1	Y	2.5	0.7	4.4	Y	0.4	0.6
		2	Y	2.5	1.3	3.7	N	---	---
		3	Y	2.1	1.0	3.3	Y	0.7	1.1
		4	Y	3.0	1.8	4.3	N	---	---
Craters of the Moon	Visitor Center	1	Y	1.1	-0.9	3.1	Y	1.2	1.7
		2	Y	2.0	0.2	3.7	N	---	---
		3	Y	1.4	-6.7	9.6	Y	0.8	1.2
		4	Y	1.5	-8.5	5.6	N	---	---
Death Valley	Park Village	1	Y	0.0	-1.3	1.3	Y	1.6	2.5
		2	Y	0.5	-1.0	1.9	N	---	---
		3	Y	0.1	-2.1	2.2	N	---	---
		4	Y	0.1	-3.9	4.2	Y	0.2	0.3
Denali	Headquarters	1	Y	0.6	-0.5	1.8	N	---	---
		2	Y	0.4	-0.5	1.3	N	---	---
		3	Y	0.1	-1.4	1.2	Y	0.5	0.7
		4	Y	1.1	-3.3	5.5	N	---	---

Table 2. 2024 Ozone Analyzer Precision and Accuracy Summary (continued).

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National Park Unit	Site Name	Calendar Quarter	Precision				Accuracy		
			Required No. of Precision Checks Met? ¹	Avg. Absolute Percent Difference ^{3,4}	Lower 95% Probability Limit ⁶	Upper 95% Probability Limit ⁶	Accuracy Check Performed During the Quarter? ²	Avg. Absolute Percent Difference ^{3,4}	Max. Absolute Percent Difference ⁵
Dinosaur	West Entrance Housing	1	Y	0.8	-0.5	2.1	Y	0.6	1.0
		2	Y	0.3	-1.1	1.6	N	---	---
		3	N	0.3	-1.8	1.2	Y	0.9	1.9
		4	Y	1.3	0.2	2.4	N	---	---
Glacier	West Glacier Horse Stables	1	Y	0.6	-2.0	3.1	Y	1.4	2.3
		2	Y	1.3	-0.1	2.8	N	---	---
		3	Y	1.0	-0.7	2.6	Y	1.5	1.8
		4	Y	1.5	-0.1	3.1	N	---	---
Grand Canyon	The Abyss	1	Y	0.5	-0.5	1.4	Y	2.2	3.6
		2	Y	0.7	-0.3	1.7	N	---	---
		3	Y	0.1	-1.3	1.4	N	---	---
		4	Y	1.0	-2.5	0.4	Y	2.4	2.7
Grand Teton	Science School	1	Y	1.7	-5.8	2.4	N	---	---
		2	Y	0.7	-3.4	2.0	Y	0.4	0.8
		3	Y	0.3	-3.2	2.6	N	---	---
		4	Y	1.8	-3.5	0.0	Y	2.5	2.7
Great Basin	Maintenance Yard	1	Y	1.4	-2.5	-0.3	N	---	---
		2	Y	0.8	-2.3	0.8	Y	1.1	1.6
		3	Y	0.6	-1.9	0.6	N	---	---
		4	Y	0.2	-2.1	2.5	Y	1.0	2.0
Great Smoky Mountains	Cades Cove	1	Y	1.0	-2.3	0.3	N	---	---
		2	Y	0.8	-2.3	0.8	Y	3.1	3.4
		3	Y	0.8	-4.1	2.5	N	---	---
		4	Y	4.0	-6.5	-1.5	Y	2.1	3.0
Great Smoky Mountains	Kuwohi (Clingmans Dome)	1	---	---	---	---	---	---	---
		2	Y	0.0	-4.5	4.6	Y	0.6	1.6
		3	Y	2.7	-2.4	7.9	N	---	---
		4	Y	2.5	-0.4	5.5	Y	3.0	5.7
Great Smoky Mountains	Cove Mountain	1	Y	0.2	-1.0	0.6	N	---	---
		2	Y	0.9	-1.8	0.1	Y	2.5	2.9
		3	Y	0.2	-0.9	0.4	N	---	---
		4	Y	0.0	-0.9	0.8	Y	0.2	0.3

Table 2. 2024 Ozone Analyzer Precision and Accuracy Summary (continued).

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			Required No. of Precision Checks Met? ¹	Avg. Absolute Percent Difference ^{3,4}	Lower 95% Probability Limit ⁶	Upper 95% Probability Limit ⁶	Accuracy Check Performed During the Quarter? ²	Avg. Absolute Percent Difference ^{3,4}	Max. Absolute Percent Difference ⁵
Great Smoky Mountains	Look Rock	1	Y	1.7	0.4	3.1	N	---	---
		2	Y	1.8	0.7	2.9	Y	1.8	2.3
		3	Y	1.4	0.0	2.7	N	---	---
		4	Y	1.3	-0.2	2.8	Y	1.0	1.7
Joshua Tree	Black Rock	1	Y	0.0	-0.8	0.7	N	---	---
		2	Y	0.2	-1.1	0.8	Y	2.5	2.8
		3	Y	1.0	-2.3	0.4	Y	1.7	2.1
		4	Y	0.3	-0.4	1.1	N	---	---
Joshua Tree	Cottonwood Visitor Center	1	Y	0.4	-1.1	1.8	N	---	---
		2	Y	0.4	-0.8	1.7	Y	0.5	1.1
		3	Y	1.5	-3.4	0.4	Y	0.6	1.3
		4	Y	0.4	-0.8	1.5	N	---	---
Lassen Volcanic	Manzanita Lake Fire Station	1	Y	0.2	-0.7	1.1	N	---	---
		2	Y	0.4	-1.4	0.7	N	---	---
		3	Y	0.1	-1.6	1.4	Y	2.2	3.7
		4	N	0.8	-0.8	2.4	Y	3.0	4.2
Mammoth Cave	Houchin Meadow	1	Y	0.1	-1.4	1.6	N	---	---
		2	Y	0.0	-0.8	0.7	Y	0.2	0.4
		3	Y	0.4	-2.2	1.5	Y	0.4	0.8
		4	Y	0.6	-0.3	1.5	N	---	---
Mesa Verde	Resource Management Area	1	Y	1.1	-2.1	-0.1	N	---	---
		2	Y	1.8	-3.2	-0.4	Y	3.3	5.5
		3	Y	0.6	-0.6	1.9	N	---	---
		4	N	0.3	-1.4	2.0	N	---	---
Pinnacles	SW of East Entrance Station	1	Y	0.8	-2.6	0.9	N	---	---
		2	Y	2.4	-3.8	-1.1	N	---	---
		3	Y	1.4	-4.2	1.4	Y	1.6	1.9
		4	Y	1.7	-4.8	1.4	Y	1.1	1.8
Rocky Mountain	Longs Peak	1	Y	0.0	-2.4	2.4	Y	0.3	1.2
		2	Y	0.7	-3.7	2.4	N	---	---
		3	Y	3.5	-6.9	0.0	N	---	---
		4	Y	2.3	-5.1	0.5	N	---	---

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			Required No. of Precision Checks Met? ¹	Avg. Absolute Percent Difference ^{3,4}	Lower 95% Probability Limit ⁶	Upper 95% Probability Limit ⁶	Accuracy Check Performed During the Quarter? ²	Avg. Absolute Percent Difference ^{3,4}	Max. Absolute Percent Difference ⁵
Sequoia and Kings Canyon	Ash Mountain	1	Y	0.3	-0.8	1.4	N	---	---
		2	Y	0.0	-3.3	3.2	Y	3.2	4.0
		3	Y	0.4	-1.7	0.9	N	---	---
		4	Y	0.5	-4.2	5.2	Y	2.9	3.6
Sequoia and Kings Canyon	Lower Kaweah	1	---	---	---	---	---	---	---
		2	Y	1.4	-3.5	0.8	Y	1.3	1.8
		3	Y	1.2	-2.6	0.1	N	---	---
		4	---	---	---	---	---	---	---
Shenandoah	Big Meadows	1	Y	0.2	-1.2	1.6	N	---	---
		2	Y	0.2	-1.9	1.5	N	---	---
		3	Y	0.7	-3.1	1.7	Y	0.2	0.5
		4	Y	0.1	-1.9	1.7	N	---	---
Voyageurs	Sullivan Bay	1	Y	2.1	-3.6	7.8	Y	1.8	2.9
		2	Y	0.8	-0.3	1.9	Y	1.1	1.5
		3	Y	0.7	-0.9	2.4	N	---	---
		4	Y	1.9	-0.8	4.5	N	---	---
Yellowstone	Water Tank	1	Y	0.6	-1.7	2.9	N	---	---
		2	Y	1.6	0.2	3.1	Y	1.0	1.4
		3	Y	2.3	1.4	3.3	N	---	---
		4	Y	0.2	-1.8	2.3	Y	1.6	1.9
Yosemite	Turtleback Dome	1	Y	1.2	-0.1	2.5	N	---	---
		2	Y	0.7	-0.1	1.6	N	---	---
		3	Y	0.1	-2.2	2.0	Y	2.5	2.9
		4	Y	0.5	-1.3	2.2	Y	1.0	1.3
Zion	Dalton's Wash	1	Y	0.4	-2.0	1.3	N	---	---
		2	Y	1.4	-3.5	0.7	Y	1.0	1.7
		3	Y	4.2	-7.1	-1.3	N	---	---
		4	Y	1.2	-6.1	3.8	Y	1.9	2.6

Font color key:

Black: Ideal - indicates a percent difference within +/-5% or a probability limit within +/-10%

Green: Acceptable - indicates a percent difference between +/-5.1-10% or a probability limit between +/-10.1-15%

Red: Unacceptable - indicates a percent difference greater than +/-10% or a probability limit greater than +/-15%

1. Precision checks are required by the Environmental Protection Agency (EPA) of all pollutant analyzers collecting data which are to be submitted to the EPA Air Quality System (AQS). A precision check is performed by challenging the pollutant analyzer with a known concentration of gas from the pollutant transfer standard. The precision check must be performed at least every 14 days of monitoring operation. The percent difference between the analyzer and the transfer standard is then calculated.³ According to NPS Standard Operating Procedures, the pollutant analyzer must respond within 7% of the transfer standard.

2. An accuracy check is performed by challenging the pollutant analyzer with a known concentration of gas from the pollutant transfer standard at several different points. The percent difference between the analyzer and the transfer standard is then calculated.³ According to the NPS Quality Assurance Project Plan (QAPP), the pollutant analyzer must respond within 10% of the transfer standard. All accuracy checks reporting here were performed by the reporting organization and not by an outside auditor.

3. Percent Difference = $((\text{analyzer} - \text{transfer standard}) / \text{transfer standard}) \times 100$

4. Average Absolute Percent Difference is the mean of the absolute value of all individual precision check percent differences during the quarter, or the mean of the absolute value of all the percent differences from each point challenged during an accuracy check.

5. Maximum Absolute Percent Difference is the highest percent difference from the points of a multipoint (or accuracy) calibration.

6. Upper/Lower 95% Probability Limits = $(\text{Average Percent Difference}) \pm (1.96)(\text{Standard Deviation of precision check percent differences in the quarter})$. The probability limits represent the interval having a 95% chance of containing the true average percent difference. Probability limits must be within $\pm 15\%$.