



# Quality Review and Exchange System for Tribes (QREST) Introduction

January 26, 2021

**Tribal Air Monitoring**



**Support Center**



**NORTHERN  
ARIZONA  
UNIVERSITY**

# Webinar Logistics



- Webinar is being recorded – URL for the recording will be in post-webinar email and posted at <https://bit.ly/AIAQTPwebinars>
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- Certificates will be emailed to participants

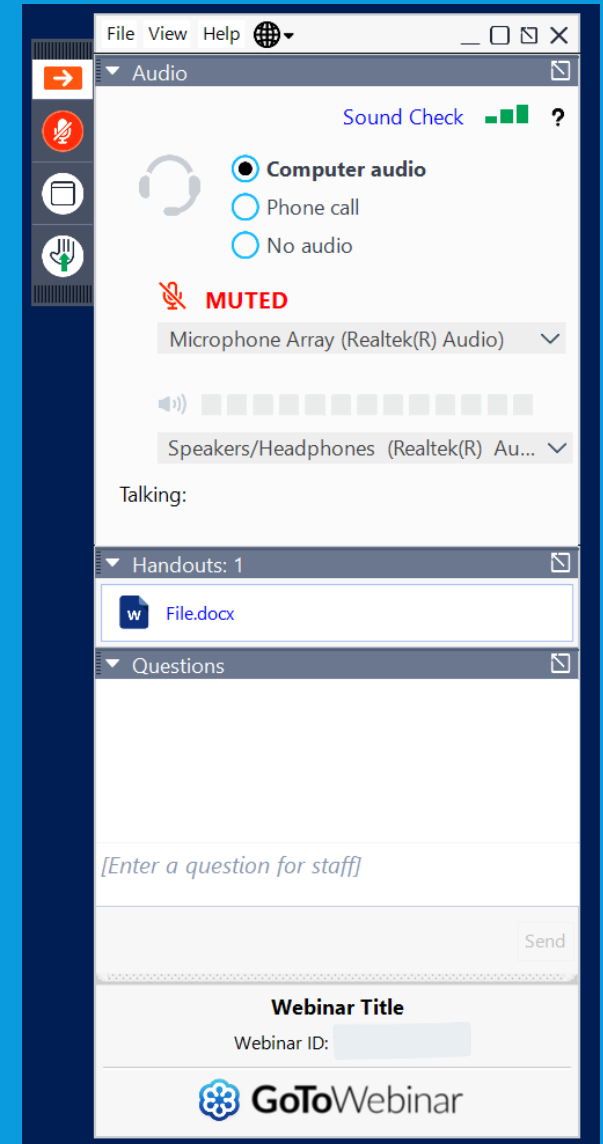
Thank you for joining!

 Submit questions in the "Questions" pane

 Raise your hand if you would like to be unmuted

 Download files from the "Handouts" pane

Presented by the Institute for Tribal Environmental Professionals  
American Indian Air Quality Training Program  
Questions? Contact [Christal.Black@nau.edu](mailto:Christal.Black@nau.edu)



# Today's objectives:

- Introduce QREST
  - Built for Tribal Agencies
  - Open source (no license fees, all code public)
  - TAMS Center managed
  - Tribal Agencies are their Agency Admins
  - Flexible: can manually import or automatically poll data, can use QC features or AQS node only
  - Help files, SOPs, videos, and individual assistance
- Learn more about your needs



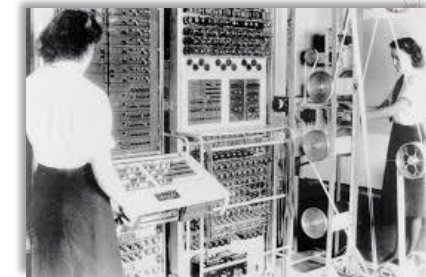
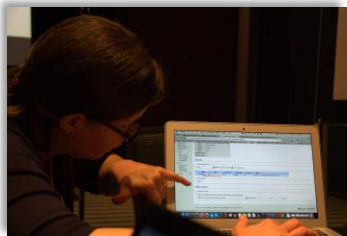
# Poll Question 1

- Does your program now gather air data? y/n
- If yes, what do you use to manage the data?
  - We use MS Excel to review data and calculate summary statistics, make charts
  - Proprietary software (e.g. AirVision)
  - Tribal Data Toolbox (from the TAMS Center)
  - No current data management system, just collect the data
  - Use a contractor to manage our data



# What is Open Source?

- A world community of users who, following the open source model, provide packages and code and advice in numerous forums, **completely free.**
- "**Open source**" means more than just code that is available free to anyone; it includes a philosophy (*the open source way*) for any kind of project that embraces and celebrates principles of open exchange, collaborative participation, rapid prototyping, transparency, meritocracy, and community-oriented development.



# What is cloud software?



- Accessible from any internet browser
- Run on remote servers (aka computer processing and storage use rented from Microsoft or Amazon, or others)
- With open source software, this cloud system:
  - Has no software licensing fees,
  - can be modified and updated by any qualified contractor,
  - management costs can be minimal (e.g., ITEP manage; updating)
  - has low cloud storage costs – backed up every night
  - TAMS Center can push out changes to everyone as instruments/EPA guidance/laws change
  - \*New features will be based on YOUR needs—this is your tool.



# Dashboard Provides Access and Control

**QREST** 149 melinda.ronca-battista@nau.edu

Home / Dashboard

## Dashboard

**149**  
NOTIFICATIONS  **1/26/2021 2:50:05 AM**  
LAST POLL (UTC)  **16**  
MY AIR SITES  **154**  
MY MONITORS

### My Sites

### Monitor Quickview

Past 24 hours (UTC)

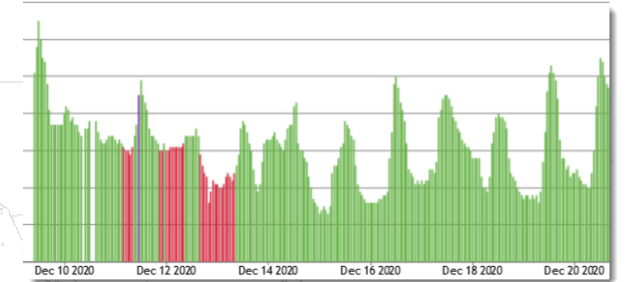
Site: KAZFLAGS341 | Par: (62101) Outdoor Temperature | POC: 1

Category	Status
Last Poll	NaN min
Last QC	Never
Last AQS Review	3 days
Last AQS Submit	Never

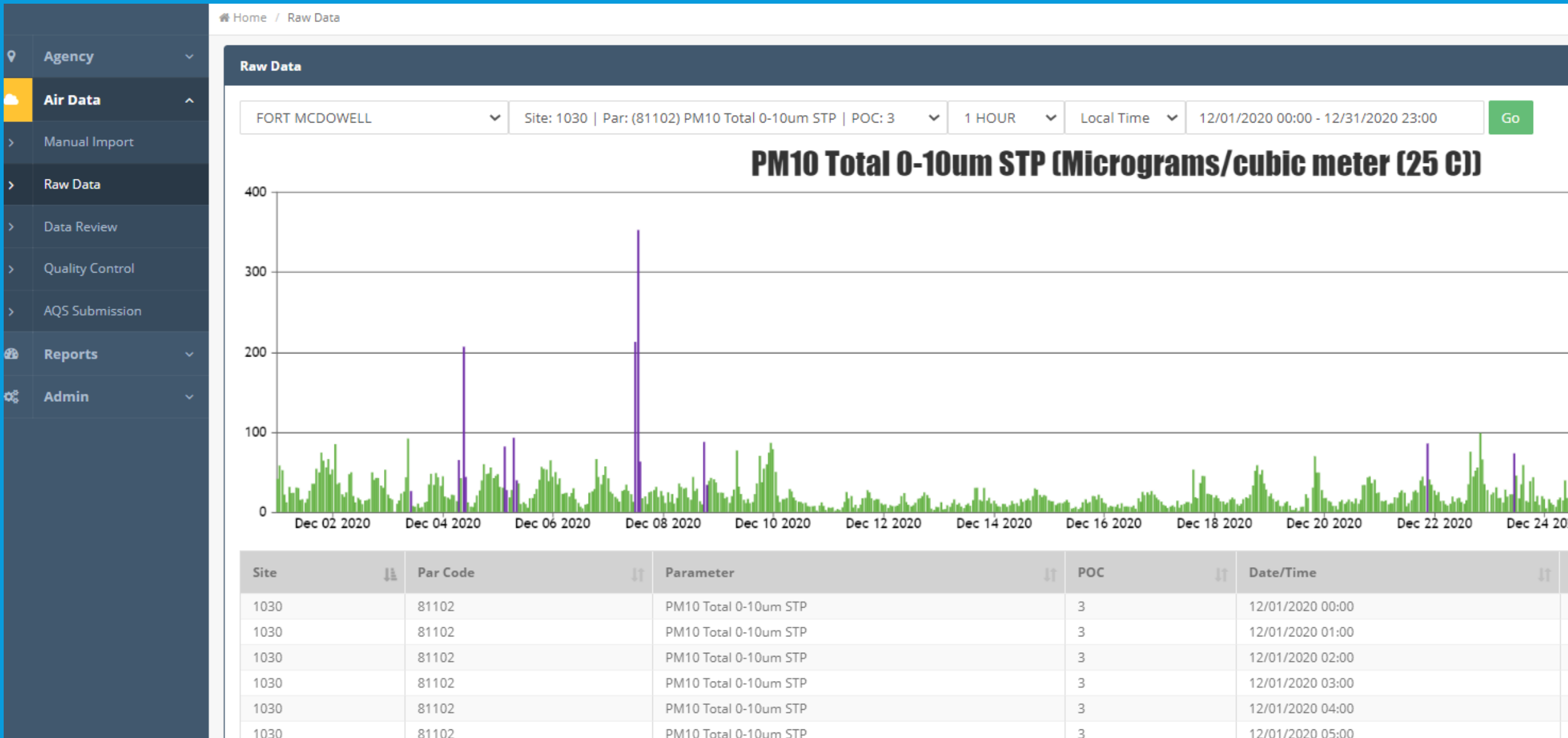


# QREST Features:

- Each Tribal Agency manages their own data and who has access,
- Audit trail of any changes—your Agency Admin sees all
- Charts and summary statistics exportable for reports,
- Provides a platform for fulfilling the independent quality assurance function (two levels of separation required between data gatherer and final data validation) required for regulatory and legally-defensible data,
- Reference and supporting data stored and accessible by data validators,
- Provide a public website with maps and (tribal-agency-approved) data,
- push data to the Exchange Network (AQS and the EPA's AirNow)



# To know your data is to love your data:



- Your Data Available Anytime, Anywhere (with internet access)

**QREST** 150 melinda.ronca-battista@nau.edu

Home / Data Review Summary

### Data Review Summary

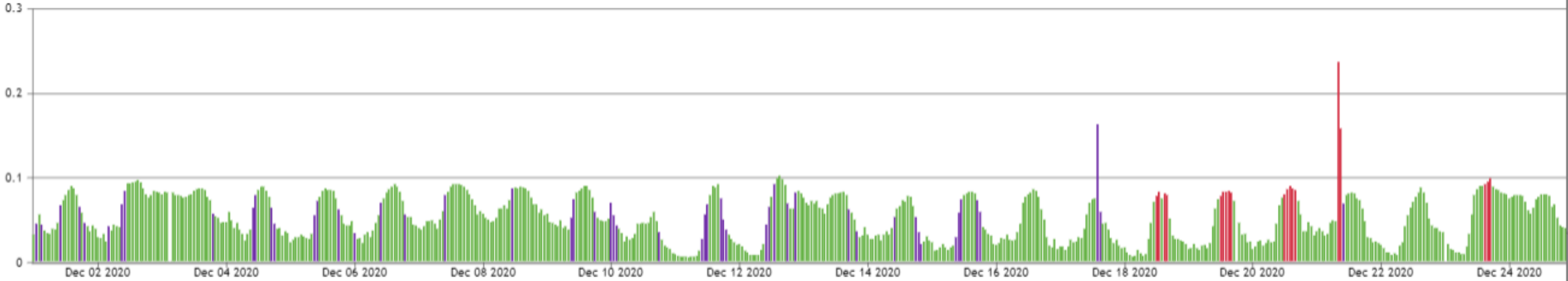
Monthly Data Review Summary Advanced Selection

1030 Fort McDowell/Yuma Frank | December | 2020 | **Go**

Parameter	Progress	Collected	Suitable for AQS	Lvl 1 Check	Lvl 2 Check
<b>Ozone</b> Par Code: 44201 POC: 1	99%	744 / 744	740 / 744	744 / 744	744 / 744
<b>Wind Speed - Scalar</b> Par Code: 61101 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Wind Speed - Resultant</b> Par Code: 61103 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Wind Direction - Resultant</b> Par Code: 61104 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Peak Wind Gust</b> Par Code: 61105 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Std Dev Hz Wind Direction</b> Par Code: 61106 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Outdoor Temperature</b> Par Code: 62101 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Indoor Temperature</b> Par Code: 62107 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Relative Humidity</b> Par Code: 62201 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Barometric pressure</b> Par Code: 64101 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>Rain/melt precipitation</b> Par Code: 65102 POC: 1	49%	744 / 744	740 / 744	0 / 744	0 / 744
<b>PM10 Total 0-10um STP</b> Par Code: 81102 POC: 3	99%	744 / 744	740 / 744	743 / 744	743 / 744

- 3 Levels of Data Review

Ozone (Parts per million)



Back

<input type="checkbox"/> All	Site <small>⌵</small>	Par Code	Parameter	POC	Local Std Time <small>⌵</small>	Value <small>⌵</small>	Unit <small>⌵</small>	QREST Flags <small>⌵</small>	AQS Null Code <small>⌵</small>	AQS Qual Codes <small>⌵</small>	Suitable for AQS <small>⌵</small>	Lvl 1 <small>⌵</small>	Lvl 2 <small>⌵</small>
<input type="checkbox"/>	1030	44201	Ozone	1	12/01/2020 00:00	0.032	Parts per million			1V	Y	Karen Shaw 12/29/2020	Karen Shaw 12/29/2020
<input type="checkbox"/>	1030	44201	Ozone	1	12/01/2020 01:00	0.045	Parts per million	JUMP		1V	Y	Karen Shaw 12/29/2020	Karen Shaw 12/29/2020
<input type="checkbox"/>	1030	44201	Ozone	1	12/01/2020 02:00	0.056	Parts per million			1V	Y	Karen Shaw 12/29/2020	Karen Shaw 12/29/2020

# Poll Question 2



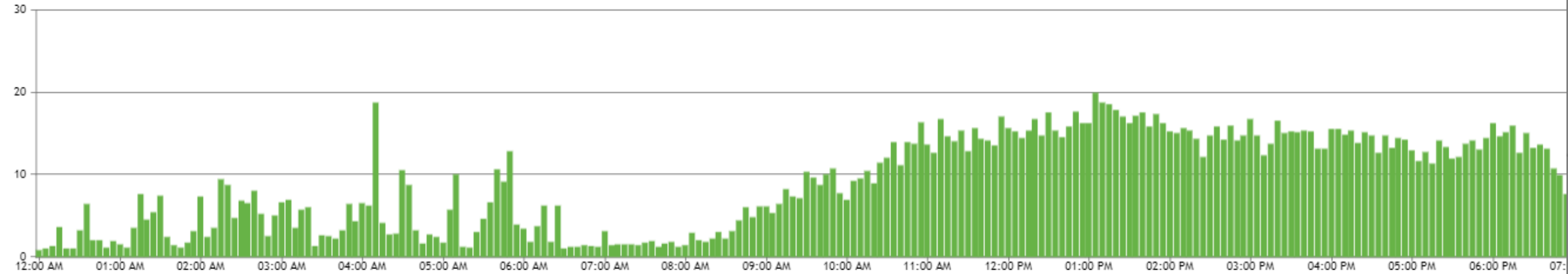
How do you access your data?

1. Remote access via site telemetry
2. Site visit and manual download from analyzer

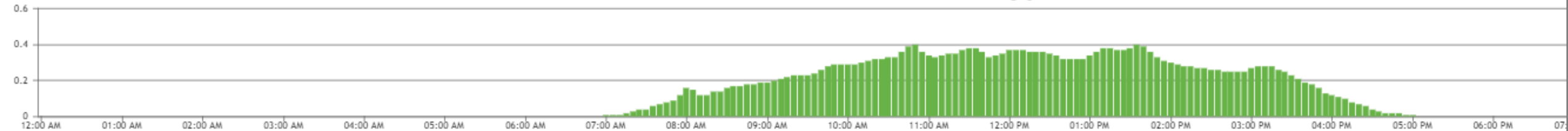
# 5-minute data pollable and importable:

Site: 1023 Parameter: Ozone (44201) POC: 1 Method: 047  
Dates: 1/25/2021 12:00:00 AM - 1/25/2021 11:59:00 PM

### Ozone (Parts per billion)



### Solar radiation (Langleys/minute)



One year of data can be imported at a time, and easy as staying in your yoga pants all day:

### Import Data

Import hourly or n-minute raw data

**Paste Data Below to Import**

--Select Import Type--

--Select Import Type--  
 Hourly: 1-Param, Hours are 24 Columns  
 Hourly  
**5-Minute**

### Import Data

Import hourly or n-minute raw data

**Paste Data Below to Import**

Hourly

ITEP KAZFLAGS341 Personal Weather Station - East Flagstaff

pm10

Run validation check (min/max/jump/stuck values) on hourly data following import

Yes

07/06/2020 13:00	26	19	16.6	4.7	242.0	33.1	6.0	651	36.8	4	12.5		0
07/06/2020 14:00	29	15	16.6	4.6	253.0	34.0	6.0	651	37.9	4	12.5		0
07/06/2020 15:00	21	20	16.6	4.5	238.0	34.6	8.0	651	38.9	5	12.5		0
07/06/2020 16:00	17	17	16.6	4.6	234.0	34.4	8.0	651	39.3	4	12.5		0
07/06/2020 17:00	12	16	16.7	4.8	234.0	33.4	9.0	650	38.6	5	12.5		0
07/06/2020 18:00	15	18	17.8	4.9	235.3	34.6	9.5	650	40.8	5	12.5		0
07/06/2020 19:00	33	100	16.6	4.6	234.0	34.4	8.0	651	39.3	4	12.5		0
07/06/2020 20:00	33	100	16.7	4.8	234.0	33.4	9.0	650	38.6	5	12.5		0
07/06/2020 21:00	21	22	18.3	4.9	234.2	34.9	10.1	650	41.7	5	12.5		0
07/06/2020 22:00	17	25	18.7	5.0	233.0	35.1	10.8	650	42.7	5	12.5		0

**Import Data**



■ QC Data Management:

### Quality Control Data Entry

**Basic Info**

Assessment Type \*

- 1-Point QC
- Annual PE
- Flow Rate Verification
- PMc Flow Rate V
- Semi-Annual Flow Rate Audit
- Zero Span

Assessment (known or true) Value

0.065

% Difference

1.54

Concentration Range

In valid concentration range (0.005-0.08)

Assessment (known or true) Value

0.04

0.04

0.06

0.061

0.07

0.071

0.03

0.031

0.025

0.023

Difference

0.00

0.001

0.001

0.001

0.002

% Difference

0.00

1.67

1.43

3.33

8.00

Concentration Range

Concentration range: 0.04 to 0.069

Concentration range: 0.04 to 0.069

Concentration range: 0.07 to 0.089

Concentration range: 0.02 to 0.039

Concentration range: 0.02 to 0.039

Send to AQS

Covers 3 distinct Audit Levels





# Poll Question 3



Do you use a datalogger? y/n  
If yes, what kind of datalogger?


1. Sutron
2. Campbell Scientific
3. Zeno
4. ESC/Agilaire
5. Other

# Now polling Sutron and Zeno dataloggers, and 1 weather station

Logger Type \*

- Zeno 3200 - TCP Connection
- Sutron - TCP Connection
- Weather.com Personal Weather Station**

## Column Mapping

	Col	Sum	Prec	Par / Method
 Edit	10	AAVG	0	61104 - Wind Direction - Resultant Method: 020 POC: 1
 Edit	10	ADEV	0	61106 - Std Dev Hz Wind Direction Method: 020 POC: 1
 Edit	16	AVG	1	61101 - Wind Speed - Scalar Method: 050 POC: 1
 Edit	19	MAX	1	61105 - Peak Wind Gust Method: 020 POC: 1
 Edit	22	AVG	1	62101 - Outdoor Temperature Method: 040 POC: 1
 Edit	25	AVG	1	62103 - Dew Point Method: 020 POC: 1

## Monitor Ping Results

### Ping Results



Ping Only



Retrieve Data

Submit

Last X Records

5

Last X records

```
1026,21/01/26,04:35:00,0,1,K,7.40,2,K,319.20,3,K,11.00,4,K,7.50,5,K,11.70,6,K,24.90,7,K,20.60,8,K,0.00,9,K,862.10,10,K,0.0000,24,K,34.20,35,K,4.40,38,K,88,50,K,0.0000,51,K,99000,
1026,21/01/26,04:40:00,0,1,K,7.40,2,K,329.90,3,K,10.20,4,K,7.50,5,K,10.00,6,K,25.00,7,K,20.20,8,K,0.00,9,K,862.11,10,K,0.0000,24,K,34.10,35,K,4.40,38,K,87,50,K,0.0000,51,K,99000,
1026,21/01/26,04:45:00,0,1,K,6.10,2,K,322.70,3,K,10.60,4,K,6.20,5,K,8.50,6,K,25.00,7,K,20.00,8,K,0.00,9,K,862.16,10,K,0.0000,24,K,34.00,35,K,4.39,38,K,86,50,K,0.0000,51,K,99000,
1026,21/01/26,04:50:00,0,1,K,4.60,2,K,313.00,3,K,10.70,4,K,4.70,5,K,6.80,6,K,24.90,7,K,19.40,8,K,0.00,9,K,862.19,10,K,0.0000,24,K,34.00,35,K,4.40,38,K,85,50,K,0.0000,51,K,99000,
1026,21/01/26,04:55:00,0,1,K,4.70,2,K,307.10,3,K,10.40,4,K,4.70,5,K,6.60,6,K,24.90,7,K,19.10,8,K,0.00,9,K,862.26,10,K,0.0000,24,K,33.90,35,K,6.01,38,K,84,50,K,0.0000,51,K,99000,68
```



# Poll Question 4:



- How do you format your data for upload to EPA's AQS?
  1. MS Excel template
  2. EPA's Transaction Generator
  3. Contractor
  4. my datalogger outputs in AQS format and I manually send data through the Exchange Network Services Center and from there into AQ
  5. I do not send data to AQS

# Prepare AQS Submission

**Select Data to Submit**

Site:

Parameters:

- (Toggle All)
- Par: (43776) Radon | Method: 001 | POC: 1
- Par: (61101) Wind Speed - Scalar | Method: 020 | POC: 1
- Par: (61104) Wind Direction - Resultant | Method: 130 | POC: 1
- Par: (62101) Outdoor Temperature | Method: 044 | POC: 1
- Par: (62201) Relative Humidity | Method: 059 | POC: 1
- Par: (63301) Solar radiation | Method: 014 | POC: 1
- Par: (64101) Barometric pressure | Method: 014 | POC: 1
- Par: (65102) Rain/melt precipitation | Method: 060 | POC: 1
- Par: (81102) PM10 Total 0-10um STP | Method: 079 | POC: 1
- Par: (Q00003) ANewParameter | Method: 001 | POC: 1
- Par: (Q00007) TestInstrumentFlag2 | Method: 001 | POC: 1

Date Range:

Action Code:

Data Format:

Range	Submitted By	Comments	Download	Status
0:00 AM - 1/1/0001	melinda ronca-battista		<a href="#">AQS_QA_20111206.txt Header File</a>	Processing <input type="button" value="Get Status"/>
00:00 AM - 00:00 AM	Melinda Ronca-Battista		<a href="#">AQS_20201201_20201201.txt Header File</a>	File Created <input type="button" value="Submit to EPA"/>
0:00 AM - 2/1/2020	Melinda Ronca-Battista	looks like there is on record still as ppb so must fix that in the data then regenerate the file	<a href="#">AQS_20200201_20200201.txt Header File</a>	Completed
0:00 PM - 4/1/2020	Melinda Ronca-Battista		<a href="#">AQS_20200401_20200401.txt Header File</a>	Completed

QA|I|Flow Rate Verification||04|005|9001|81102|1|20111206|0079|073|16.7|16.67

RD|I|04|005|9001|44201|1|1|007|047|20200201|00:00|0.028  
 RD|I|04|005|9001|44201|1|1|008|047|20200201|01:00|0.027  
 RD|I|04|005|9001|44201|1|1|007|047|20200201|02:00|0.021

Environmental Information | **exchange Network** | SERVICES CENTER

**SERVICES CENTER**

The Exchange Network Services Center is a web-based tool designed to help Exchange Network users to easily send, get, and download information from other partners on the network.

Note: To access this tool, you must already have an Exchange Network user account assigned to you.

[Request an Account](#)

**Login**

Username:

Password:

Domain:

Environmental Information | **exchange Network**

**AQS**

**Launch Web Application**

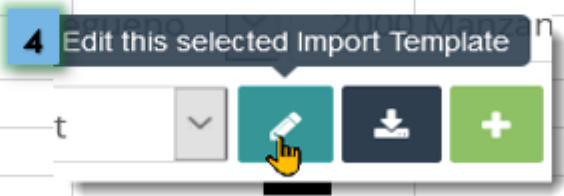
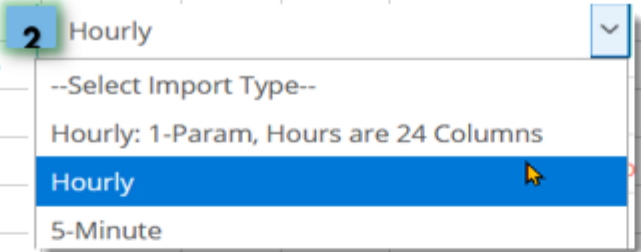
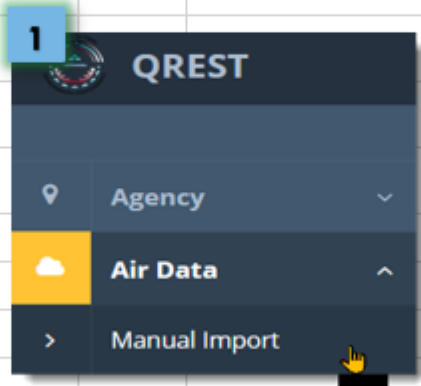
# Poll Question 5



What is your biggest frustration about air data management?

- 1. Time consuming
- 2. No qualified people are available to conduct an independent data review
- 3. Getting data into AQS
- 4. Managing monitoring equipment (maintenance, repair, calibrations)
- No frustrations—data management and reporting is super fun 😊

SOP:	Manual Importing	version:	1.0	date:	01/12/2021	responsibility:	Site Operator
						required:	electronic data file to be imported (up to one year of hourly data for 1 parameter)
Step:						prereq:	The appropriate Import Config has been established in QREST for this datafile's format
1	Go to Air Data->Manual Import						
2	Select datafile type						
3	Select Agency, Site, and the Import Template that is appropriate for the datafile format.						
4	If the Import Template needs to be edited for this datafile's format, edit and save with a new name, as appropriate (see SOP for Setting Import Config).						



## QREST Help

- Getting Started
  - Users Guide
  - FAQ
  - Tutorial Videos
  - Creating an Account
  - Retrieving Lost Password
  - Dashboard
- Site Management
  - Tribe Management
  - Site Management
  - Monitor Management
  - Polling Configuration
- Air Data
  - QREST Data Logger Retrieval Workflow
  - Manual Import
  - Raw Data
  - Data Review
- Quality Control

For each row, enter in the validation checks.

- Validation Checks:**
- Annual Performance
    - Distinct C
    - Percentag
      - Sulf
    - Concentra
      - Sulf
  - 1-Point QC:
    - Concentra
      - Sulf
      - Ozo
    - Percentag
      - Sulf
      - Ozo
    - Concentra
      - Sulf
      - Ozo
  - Flow Rate Verifi
    - Percentag
      - PM
      - PM



0.61	130.76	0.1	91.1	790.97	2	1.01	146.13	0	130.91	0.7
0.61	130.78	-0.1	90.4	740.57	3	1.11	148.42	0	144.28	0.64
0.61	130.81	1.5	87.8	740.9	78	0.61	147.19	0	153.54	0.27
0.61	130.96	5.1	72.8	741.14	331	0.74	141.95	0	5.27	0.43
0.61	131.15	10	50.2	741.2	555	1.06	136.71	0	345.41	0.82
0.61	131.35	13.4	25.9	741.3	740	2.53	116.17	0	10.32	2.3
0.61	131.25	15.4	21	741.26	875	2.77	134.48	0	9.2	2.46
0.61	131.15	17.7	17.6	741.05	940	1.99	143.32	0	13.52	1.45
0.61	131.08	18.7	14	740.8	925	2.74	179.36	0	355.38	2.22
0.61	131.04	19.4	12.5	740.48	851	2.81	188.77	0	354.29	2.4
0.61	131	19.3	11.1	740.3	696	3.24	236.31	0	247.2	2.66
0.61	130.71	18	29.9	740.5	508	2.84	221.61	0	236.62	2.1
0.61	130.97	16.6	30	740.74	290	2.96	140.12	0	136.55	2.62
0.61	130.93	14.4	30.7	741.13	57	2.74	139.95	0	135.34	2.45
0.61	130.78	12.6	29.5	741.75	3	1.23	158.23	0	137.99	0.73
0.61	130.63	11.6	36.2	742.26	2	1.67	140.72	0	134.18	1.42
0.61	130.55	9.2	46.4	742.97	2	1.5	126.32	0	127.72	1.43
0.61	130.29	6.4	57.7	743.39	2	1.87	133.02	0	132.36	1.82
0.61	130.27	4.9	64.4	743.54	2	1.71	127.85	0	127.87	1.68
0.61	130.31	3.8	69.6	743.59	2	1.72	134.93	0	132.08	1.67
0.61	130.25	2.7	75.4	743.5	2	1.85	128.61	0	128.73	1.83
0.61	130.16	2.3	77.4	743.37	3	1.75	128.86	0	130.09	1.72
0.61	130.09	1.3	81.5	743.21	3	2.07	128.95	0	128.62	2.06
0.61	130.02	1	83.2	743.19	2	1.9	128.34	0	128.16	1.88
0.61	129.76	0.9	84	743.4	3	1.77	129.4	0	129.37	1.76
0.61	129.43	0.4	85.6	743.81	3	1.89	131.95	0	131.64	1.87
0.61	129.35	1.5	81.8	744.17	77	1.35	131.46	0	131.34	1.33
0.61	129.68	6.7	65.1	744.34	329	0.5	207.09	0	30.07	0.12
0.61	130.12	10.7	47.7	744.24	544	0.72	246.34	0	343.05	0.64
0.61	130.44	15.1	34.4	744.11	740	0.81	220.38	0	343.95	0.65
0.61	130.78	20.1	23.3	743.71	873	1.99	199.27	0	366.43	0.87
0.61	131.01	21.2	26.2	743.29	922	3.32	170.34	0	351.15	2.1
0.61	130.88	22.1	20.1	742.76	914	3.38	244.51	0	244.24	3.23
0.61	130.95	22.6	21	742.21	839	3.36	240.31	0	241.9	3.19
0.61	130.79	21.7	27.2	741.85	697	4.16	242.69	0	242.4	3.99
0.61	130.68	20.6	27.2	741.66	509	4.88	240.05	0	240.13	4.7

THE SYSTEM FOR TRIBES

# Presenters



**Melinda Ronca-Battista,  
Tribal Air Monitoring Support  
Center**

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# Resources



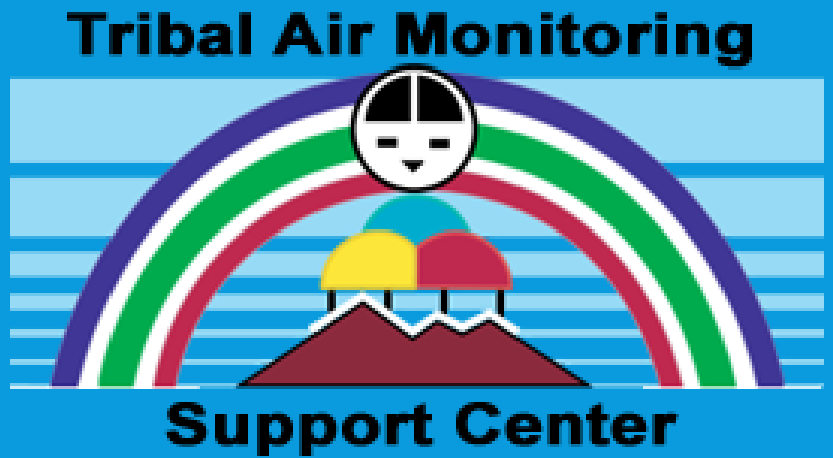
## Tribal Air Monitoring Support Center Resources:

- [TAMS Guidance on Developing Tribal Air Quality Programs](#)
- [Professional Assistance](#)
- QREST Help Files with embedded SOPs and videos
- One on one assistance available, especially for connecting dataloggers

# Useful Links & Contacts



- **QREST production site:** <https://qrest.net/>
- QREST-test site, with demonstration data and available for your exploration: <https://qrest-test.azurewebsites.net/>
- QREST SOPs: <http://bit.ly/QREST-SOPs>
- Videos on QREST, including QA Features: [http://bit.ly/QREST\\_training\\_videos](http://bit.ly/QREST_training_videos)
- <https://opensource.com/open-source-way>
- TAMS Center Director: Christopher Lee, [Christopher.lee@nau.edu](mailto:Christopher.lee@nau.edu)
- QREST technician: [melinda.ronca-battista@nau.edu](mailto:melinda.ronca-battista@nau.edu)
- QREST Open Source Developer: Doug Timms, [doug.timms@open-environment.org](mailto:doug.timms@open-environment.org)



Thank you for joining today's webinar!