

Tribal Air Monitoring



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August 13, 2020
RTOC



Introduction

- Assessing Potential Ambient Air Quality Issues
- Ambient Air Monitoring Objectives
 - Setting Data Quality Objectives
 - Monitoring for “Informational Purposes”
 - Monitoring for “Regulatory Purposes”
- Key Air Monitoring QA Requirements
- EPA Expectations for Air Monitoring Programs

Assessing Potential Ambient Air Quality Issues

- Understanding Emissions Sources
 - Identifying types of emissions sources
 - Developing an emissions inventory
- Ambient Air Monitoring
 - Reviewing existing monitoring data
 - Implementing an air monitoring program
- Air Quality Modeling



Ambient Air Monitoring Objectives

- Setting Data Quality Objectives
 - Why are data needed?
 - How will the data be used and by whom?
 - What measurements are required (e.g. which pollutants)?
 - How much uncertainty can the data have, while still meeting your data needs?

Ambient Air Monitoring Objectives

- Monitoring for “Informational Purposes”
 - Initial assessment of air quality
 - Identify potential sources
 - Provide public information/outreach/notification
 - Characterize high pollution episodes
 - Support research studies
 - Evaluate effectiveness of air pollution control measure/strategies

Ambient Air Monitoring Objectives

- Benefits of Monitoring for “Informational purposes”
 - Informational air quality data can be used for state/local/tribal policy and regulation
 - Increased flexibility in implementation (e.g. monitoring equipment, location, and duration)
 - Fewer requirements + More flexibility = Appropriate information that costs less
 - Informational monitors enable greater spatial coverage and can help determine locations for siting regulatory monitors

Ambient Air Monitoring Objectives

- Monitoring for “regulatory purposes”
 - For a very specific objective
 - Data from “regulatory” monitors is required for specific EPA regulatory actions (e.g. NAAQS* designations decisions, attainment/Clean Data findings).

* National Ambient Air Quality Standards

Ambient Air Monitoring Objectives

- Benefits of monitoring for “regulatory purposes”
 - Tribe specific data can be used for regulatory actions
 - Tribal lands are currently designated non-attainment along with surrounding area, but information sources (e.g., informational monitoring) indicate air quality on the reservation is different (attaining the NAAQS).
 - Tribal lands are currently designated attainment along with surrounding area, but information sources (e.g., informational monitoring) indicate NAAQS violations on the reservation.

Key Air Monitoring QA Requirements (Regulatory Monitoring)

- Key Considerations:
 - A strong quality assurance program must be in place so that national decisions on air quality with respect to the NAAQS are consistent and based on data that is technically and legally defensible.
 - Primary Quality Assurance Organization (PQAO)
 - Approved by EPA as a PQAO or
 - Joining with an already established PQAO
 - Regulatory monitoring is **very** resource intensive: personnel, equipment, O&M, contract services (e.g. audits, PM_{2.5} filter weighing laboratory)

Key Air Monitoring QA Requirements

(Regulatory Monitoring)

- Regulatory monitoring requires strict adherence to 40 CFR Parts 50, 53, 58 and related appendices:
 - 40 CFR Part 50 (NAAQS)
 - 40 CFR Part 53 (FRM/FEM methods)
 - 40 CFR Part 58, and Appendices A, C, D, & E
- Additional key EPA documents:
 - EPA QA Handbook Volumes II and IV
 - EPA QA Guidance Documents
 - EPA Technical Assistance Documents (TAD)

Key Air Monitoring QA Requirements

(Regulatory Monitoring)

- Perform all required QC checks including:
 - One point QC checks (O_3 , NO_2 , SO_2 & CO)
 - Monthly/quarterly flow verifications (PM_{10} , $PM_{2.5}$ & Pb)
- Perform all required QA audits including:
 - Annual/quarterly performance evaluations (O_3 , NO_2 , SO_2 & CO)
 - Semi-annual flow audits (PM_{10} , $PM_{2.5}$ & Pb)
- Monitoring instruments must be designated FRM or FEM
- Certifications for reference standards (reference gas, zero air, flow, temperature, RH) must be NIST-traceable and recertified regularly and appropriately.

Key Air Monitoring QA Requirements (Regulatory Monitoring)

- Documents to be submitted to EPA for review and approval:
 - QA documents (in place prior to start of monitoring), reviewed/revised annually or for significant changes/updates:
 - Quality Management Plan (QMP)
 - Quality Assurance Project Plan (QAPP)
 - Standard Operating Procedures (SOPs) – part of the QAPP
 - Annually submit a Network Plan (ANP)
 - Every five years, submit a Network Assessment (with the ANP)

Key Air Monitoring QA Requirements (Regulatory Monitoring)

- Data Requirements
 - Valid design value requires 3 Years* of complete data
 - Pollutant data “completeness” requirements defined in CFR
 - A robust data review process is needed to ensure that data used for regulatory purposes is technically and legally defensible.
 - Failure to adhere to QA requirements can result in invalidation of data.
 - Monitor data and QA/QC data must be submitted to AQS quarterly
- * Except for CO

Key Air Monitoring QA Requirements (Regulatory Monitoring)

- Participate in EPA Technical Systems Audits (TSA) every three years.
- Region 9 tribal TSAs:
 - Generally last 2-3 days depending on size of the network
 - EPA issues a TSA report
 - Tribe must submit to EPA for approval, Corrective Action Plans (CAPS) to address all TSA findings and implement the approved CAPS.

Key Air Monitoring QA Requirements (Regulatory Monitoring)

- Grant funds* for participating in EPA National QA programs
 - National Performance Audit Program (NPAP) (O₃, NO₂, SO₂ & CO)
 - Performance Evaluation Program (PEP) (Pb and PM_{2.5})

*Funds held back from grant

Key Air Monitoring QA Requirements

- Monitoring for “informational purposes” does not require strict adherence to 40 CFR Parts 50, 53, 58 and related appendices.
- QA/QC requirements still apply but are dependent on the specific monitoring purpose and associated data quality objectives.

EPA Expectations for Air Monitoring Programs

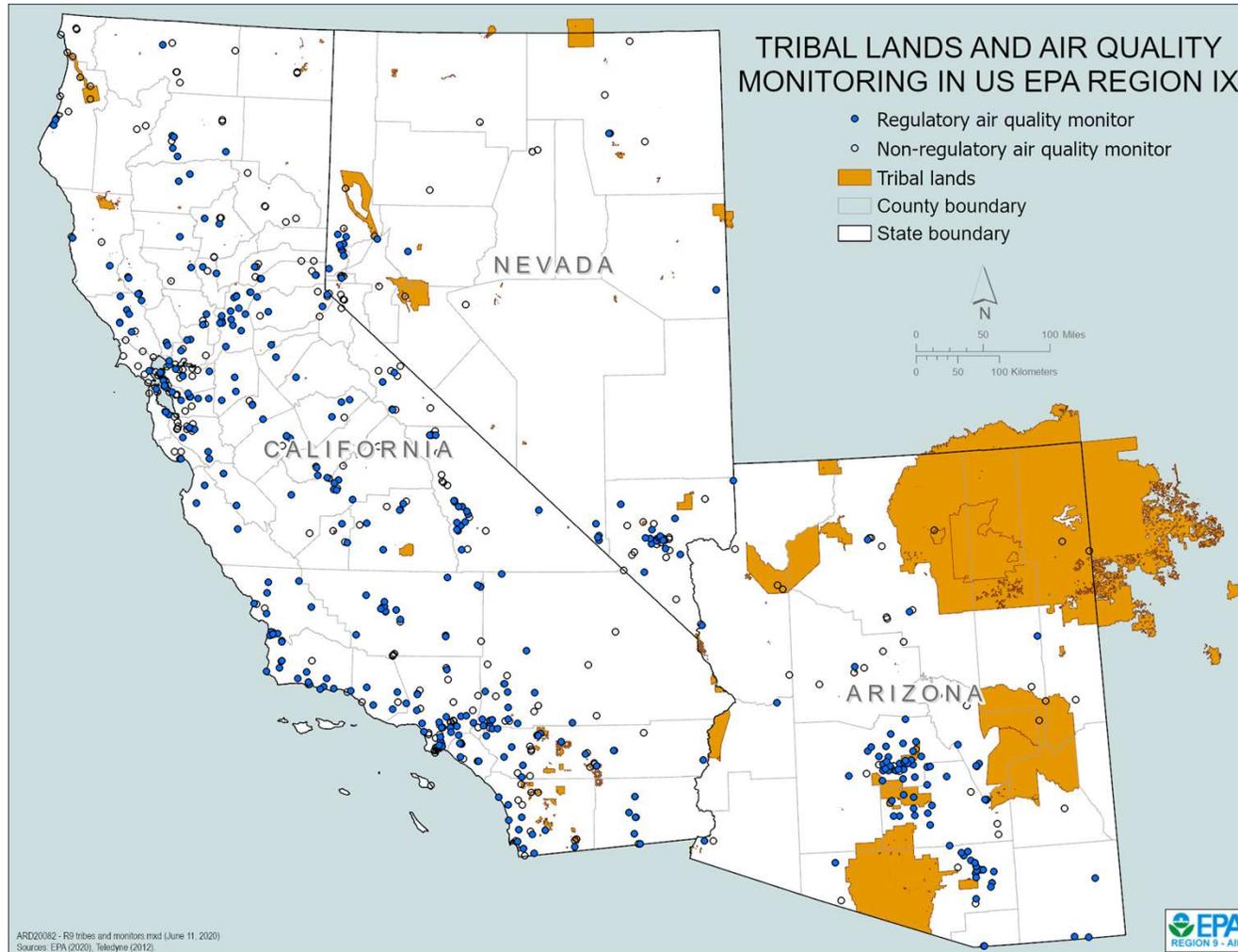
- Regardless of monitoring objective, tribal monitoring programs should:
 - Have clear expectations and understanding of the purpose of the monitoring program
 - Efficiently and effectively implement program requirements
 - Establish a strong quality assurance program that includes documentation, QA personnel, and processes
 - Submit data to EPA via AQS
 - Regularly communicate and work with EPA Air Quality Analysis Office

Thank you for your time and interest!

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Additional Information

Region 9 Ambient Air Monitoring Network



Key Regulations and Requirements Documents

- Key regulations:
 - 40 CFR Part 50 (NAAQS),
 - 40 CFR Part 53, and
 - 40 CFR Part 58, and Appendices A, C, D, & E
- Additional key EPA requirements documents
 - List of Designated Reference and Equivalent Methods
 - EPA QA Handbook Volumes II and IV
 - EPA QA Handbook Volume II, Appendix D, Measurement Quality Objectives and Validation Templates
 - EPA QA Guidance Documents 2.10 (PM₁₀), and 2.12 (PM_{2.5})
 - EPA Technical Assistance Documents (TAD)

NPAP and Pb-PEP Program

- NPAP
 - Audits of 20% of PQAQO sites (primary monitors for all gaseous pollutants) every year, 100% in six years
- Pb-PEP
 - One audit/year for PQAQOs with \leq five Pb sites
 - Two audits/year for PQAQOs with $>$ five Pb sites
- Approximate EPA/ESAT contractor cost = \$3000/audit
- PQAQOs that desire to self-implement NPAP/PEP must receive approval from EPA

PM_{2.5} PEP Program

- Five valid audits/year for PQAOs with \leq five PM_{2.5} sites
- Eight valid audits/year for PQAOs with $>$ five PM_{2.5} sites
- Approximate EPA/ESAT contractor cost = \$3000/audit
- PQAOs that desire to self-implement NPAP/PEP must receive approval from EPA

Useful Web Links

- Sources of monitoring data
 - AirNow: www.airnow.gov
 - AIRNow-Tech: www.airnowtech.org
 - EPA AirData: <http://www.epa.gov/outdoor-air-quality-data/>
 - AQS: <http://www.epa.gov/aqs>
- Ambient Monitoring Technology Information Center (AMTIC) <https://www.epa.gov/amtic>

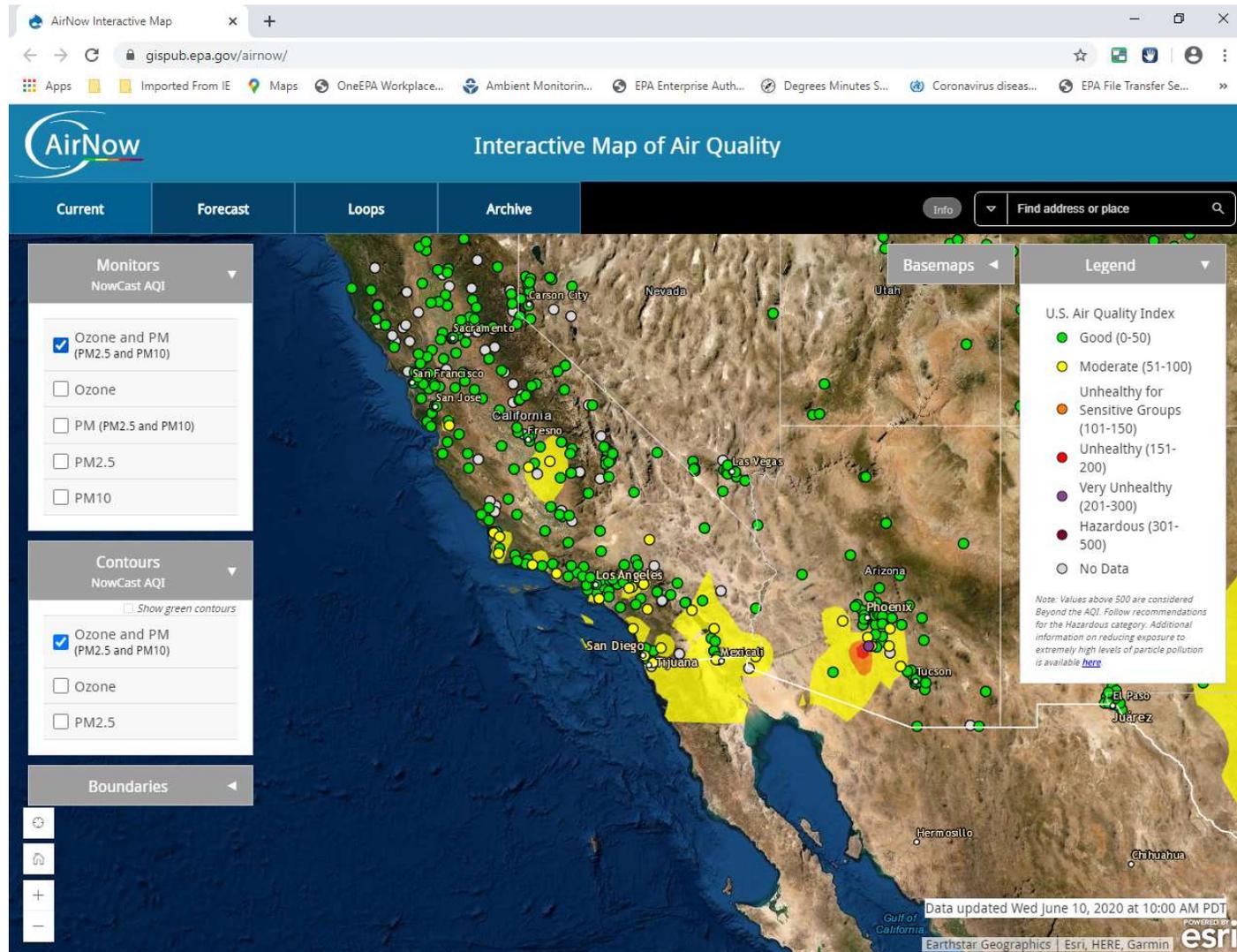
Useful Web Links (cont.)

- Emissions
 - <https://www.epa.gov/air-emissions-inventories>
- Air quality modeling
 - EPA Support Center for Regulatory Atmospheric Modeling (SCRAM): www.epa.gov/scram

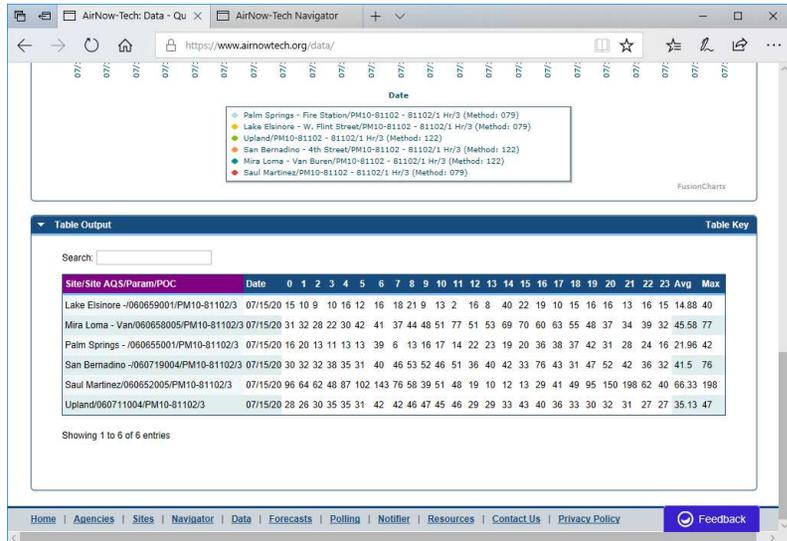
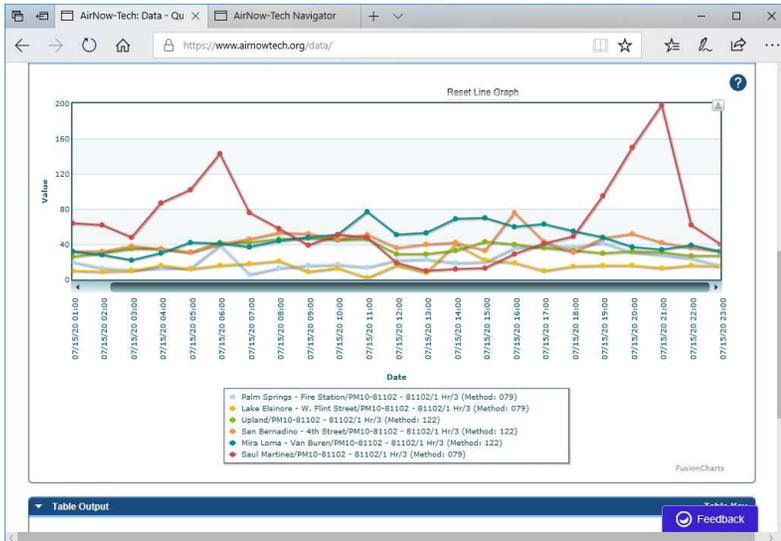
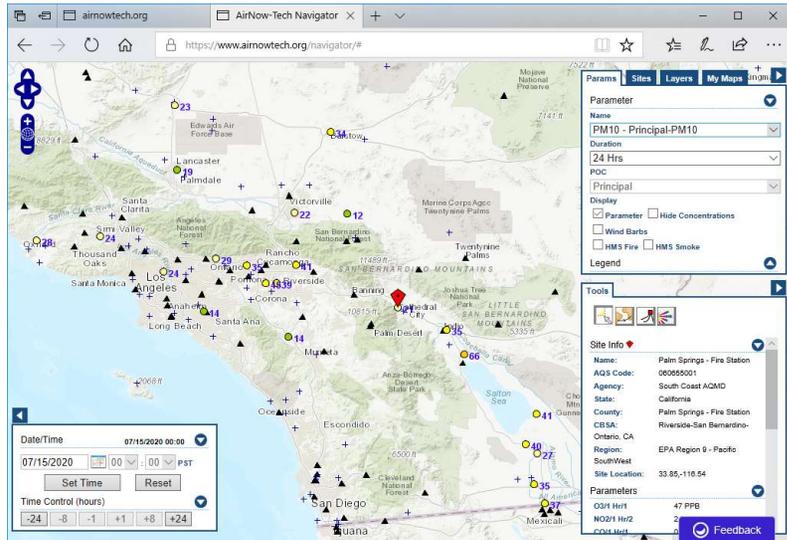
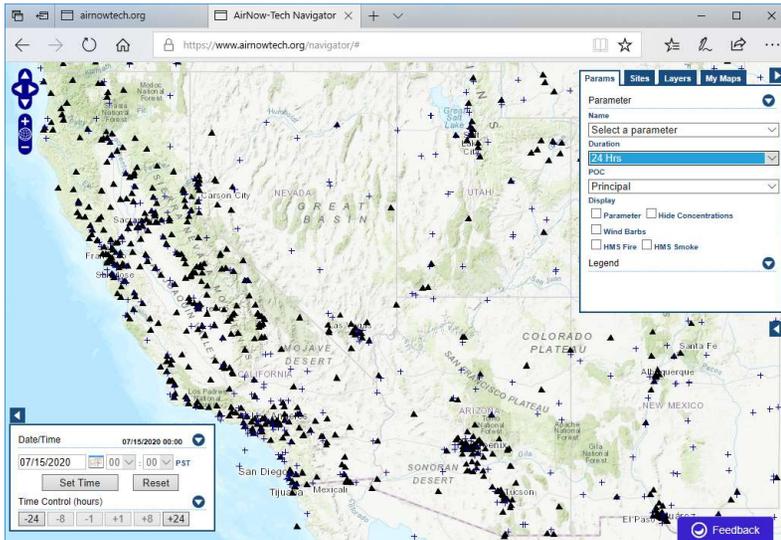
EPA AirData

The screenshot shows the EPA AirData website. At the top, there's a navigation bar with 'Environmental Topics', 'Laws & Regulations', and 'About EPA'. A search bar is also present. The main heading is 'Air Data: Air Quality Data Collected at Outdoor Monitors Across the US'. Below this, there's a 'Daily Air Quality Tracker' section with a line graph showing AQI values. The graph has a 'MODERATE' label in yellow. To the right of the graph, there are links for 'CONTACT US', 'SHARE' (with Facebook, Twitter, and Email icons), and 'The tools below are connected directly to EPA's Air Quality System Data Mart.' with links for 'Basic Information' and 'Frequent Questions'. At the bottom, there are three main sections: 'Download Data' with a 'Pre-generated Data Files' link and a 'FILES' icon; 'Monitor Locations' with a map icon; and 'Air Data Updates' with an RSS icon and a description: 'Subscribe to our RSS feed to keep up with the latest news, including scheduled system'.

AirNow – Air Quality Index (AQI): Region 9



AirNow-Tech: Region 9



Sensor Considerations and Resources

- Key Considerations for Using Sensors for AQ Measurements
 - Not a replacement for regulatory grade, high quality monitors
 - Must be selected to fit a purpose
 - Quality assurance is critical
 - Requires more sophisticated data recovery and manipulation software. Data collection often results in millions of data points!
 - Allows for partnerships and engagement with government, academia, and the public are important



Sensor Resources

- EPA Air Sensor Toolbox web page provides citizen scientists and others resources on air sensors
- Air Sensor Guidebook is one of the most popular resources in the Toolbox
 - <https://www.epa.gov/air-sensor-toolbox>
- The South Coast AQMD Air Quality Sensor Performance Evaluation Center (AQ-SPEC) also provides a wealth of resources on sensors, including laboratory and field performance sensor evaluations
 - <http://www.aqmd.gov/aq-spec>

The image shows two screenshots of websites related to air quality sensors. The top screenshot is the EPA Air Sensor Toolbox website, featuring a navigation bar with 'Environmental Topics', 'Laws & Regulations', and 'About EPA'. The main content area includes a section for 'New Educational Videos on Air Sensors Released' with a 'Watch the videos' link, and several other resource links: 'How to Use Air Sensors', 'What Do My Sensor Readings Mean?', 'What is EPA Doing?', and 'Resources and Funding'. There is also an 'Announcements' section with an email sign-up form. The bottom screenshot is the AQ-SPEC website, titled 'Air Quality Sensor Performance Evaluation Center'. It features a 'Sensor Description' section for the Aeroqual AQY v0.5 sensor, listing manufacturer/model, pollutants (Ozone), and measurement range (0 - 200 ppb). It also includes an 'Evaluation Summary' with bullet points about sensor accuracy and precision, and a 'Field Evaluation Highlights' section with details on deployment and data recovery.