NATTS Network Assessment, Part 2:

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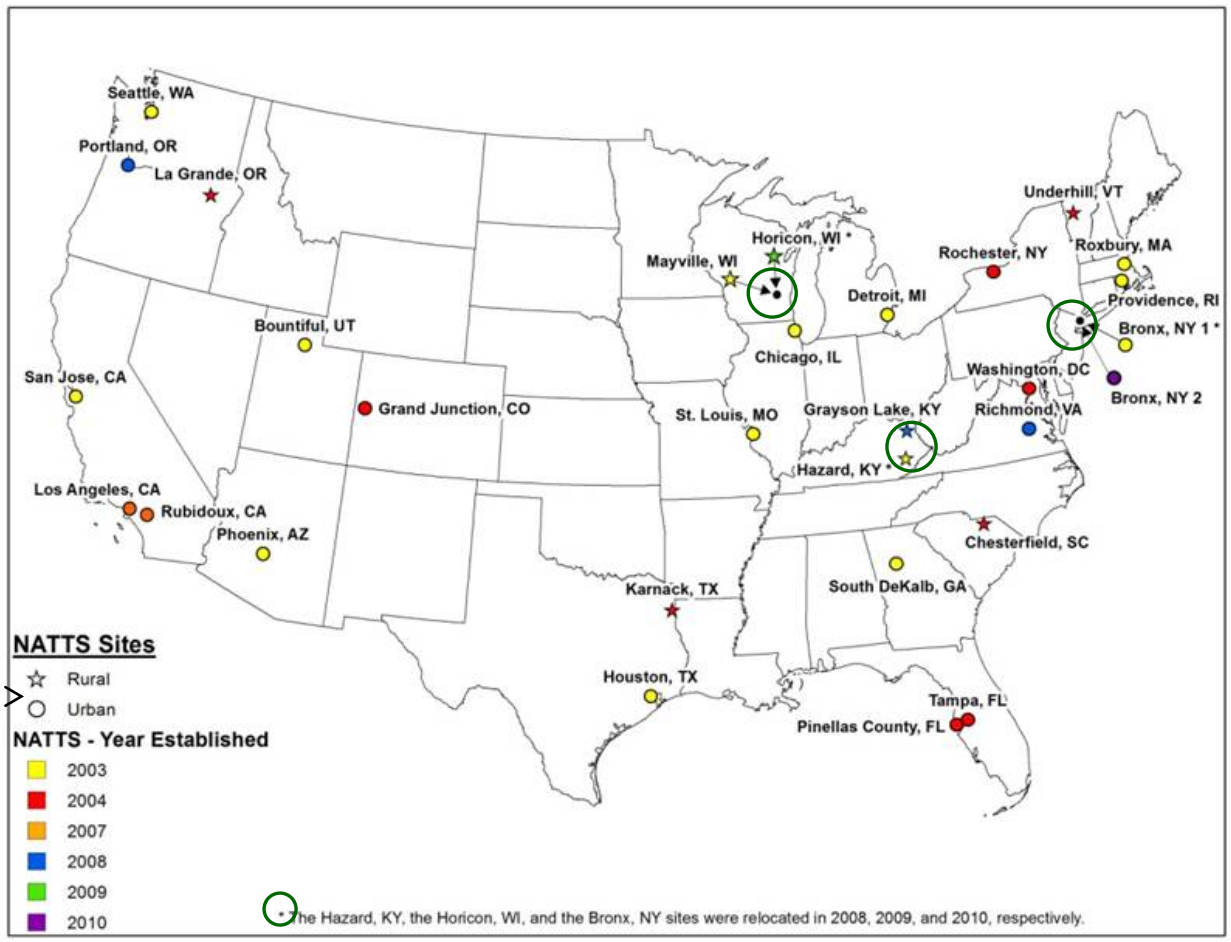
Scope of the Assessment

- Goal is to determine…
  - *Are the NATTS goals and objectives still relevant?*
  - *Are the NATTS data collected adequate to meet the program goals?*
  - *What changes to the current network design would be appropriate to improve the NATTS?*
- Assess the NATTS Trends Data Quality Objective:

  To be able to detect a 15 percent difference (trend) between the annual mean concentrations of successive 3-year periods ***within acceptable levels of decision error****.*

NATTS Sites and Years



6 Rural
21 Urban

First Assessment

- Provided Background/History of NATTS Program
- Covered measurements from 2003-2010
  - Special focus on 2005-2010 (23 sites fully operating)
- Evaluated NATTS AQS data reporting
- Evaluated MQOs and scored each pollutant dataset
  - Completeness
  - Sensitivity
  - Bias
  - Precision

MQO Scoring

MQO	A rated	B rated	Original weighting	Adjusted weighting
Completeness	≥ 85%	75%-85%	25%	40%
Sensitivity	Ratio ≤ 1.00	Ratio > 1.00 to ≤ 2.00	25%	30%
Bias	± 25%	>25% to ≤ 35% < -25% to ≥ -35%	25%	20%
Precision	≤15%	> 15% to ≤ 25%	25%	10%

- 1st Assessment: Total datasets evaluated = 2,827
  - A-Rated = 61%
  - B-Rated = 22%
  - Does Not Meet MQO = 17%

2nd Assessment Status

- Calculated 3-year block averages (316 site-polls)

Pollutant	# Sites	
	# Sites	%DIFF
Acetaldehyde	13	-15.9
Arsenic (PM10)	8	-12.2
Benzene	14	-18.2
Benzo(a)pyrene	NA	NA
Beryllium (PM10)	12	-22.2
Butadiene, 1,3-	12	-28.3
Cadmium (PM10)	14	-28.6
Carbon Tetrachloride	11	+8.7
Chloroform	16	+16.5

Pollutant	# Sites	
	# Sites	%DIFF
Chromium VI	12	-37.4
Formaldehyde	12	-18.6
Lead (PM10)	14	-34.6
Manganese (PM10)	13	-14.6
Naphthalene	NA	NA
Nickel (PM10)	12	-32.4
Tetrachloroethylene	14	-42.6
Trichloroethylene	16	-33.5
Vinyl Chloride	13	+15.9

1st Assessment Top 10 Items

EPA Action Item	EPA Result
1. Review NATTS Pollutant List	Chromium^{6+} made optional
2. Move/Add NATTS Sites	Evaluated, but no decision
3. Review NATTS DQO	Workgroup convened; DQO slightly revised
4. Refine NATTS MQOs	MDL updates
5. NATTS Reporting Oversight	Program office reviews data annually
6. Increase PT Sampling	Moving towards 2 samples per year for specific methods
7. Equipment Replacement	Provided $ for new equipment
8. Review Sampling Methods	Currently reviewing TO-11A and acrolein; approved new lead (PM_{10}) equivalency method
9. Update TAD	Nearly complete
10. Increased communication to NATTS sites	Site-specific mini-reports; NATTS Quarterly Calls; second assessment; training

Second Assessment Rationale

- Include naphthalene and benzo(a)pyrene – sampling began in 2007/2008

- Include data from new sites
  - Los Angeles, CA
  - Rubidoux, CA
  - Portland, OR
  - Richmond, VA

Second Assessment Rationale

- Include data from original sites
  - San Jose, CA (began 1-in-6 day sampling in 2008)
  - Seattle, WA (data issues in 2005)
  - Rochester, NY for PM_{10} metals (began sampling 2007)

- More data to evaluate trends

- NATTS data is being used by several end-users
  - e.g., NATA; Report to Congress; Enforcement

NATTS AQS Data Reporting Update

- NATTS Workplan **requires** AQS reporting 120 days after calendar quarter.
  - e.g. 2014 data to be in AQS by 5/1/2015
  - EPA initially pulled all NATTS data on 7/1/2015

- Although percent completeness increased, there were still issues:
  - Missing MQO datasets (e.g., entire 2013 VOCs)
  - Missing pollutant datasets (e.g., 2012 benzene)
  - Missing concentrations within a dataset (e.g., 2nd quarter acetaldehyde)

NATTS AQS Data Reporting Update

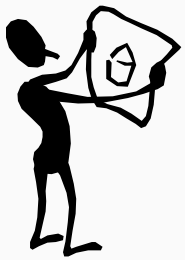
Metric	Reason
Reporting of Alternative Method Detection Limits (MDLs)	Work Plan requirement
National calendar day sampling	Consistency for national trends
Reported engineering units	Evaluate how sites are reporting data (e.g. – 15 of 27 sites reporting local conditions for PM_{10} in 2014)
Reporting of non-detects	Work Plan requirement
Reporting of under-MDL data	Work Plan requirement
Miscoding of data elements	Consistency for national trends
Reporting of Analytical Precision data	Work Plan requirement (7/1/2011)

NATTS AQS Data Reporting Update

Metric	Reason
Use of data qualifiers and null data codes	Work Plan requirement; QA
Reporting of collocated and duplicate data	Work Plan requirement
Reporting of other (non-NATTS MQO Core) HAPs	Informational; QA; Data analysis
Reporting of non-HAPs	Informational; QA; Data analysis
Reporting of criteria pollutants	Informational; Data analysis
Reporting of meteorological measurements	Informational; Data analysis
Identification of NATTS monitors within AQS	Informational; QA

2nd Assessment Status

- Assessed TSA Instrument Performance Audits (IPAs) and schedules
- Conducted NATTS Site Operator surveys
- Measurements database finalized
  - Synchronized with Phase 10 HAP Archive database, plus missing data from subsequent AQS pulls and NATTS Operators

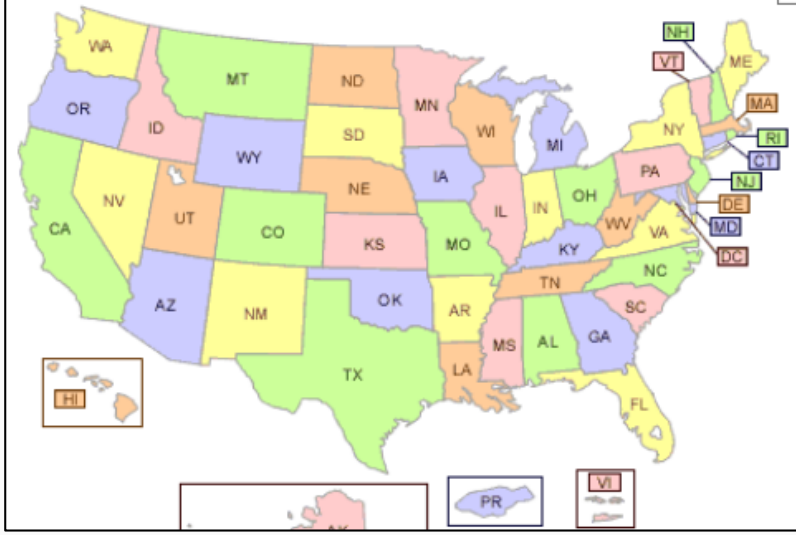


Phase X Ambient Monitoring Archive for HAPs

EPA recently finalized Phase X of the Ambient Monitoring Archive (AMA) for hazardous air pollutants (HAPs), also referred to as the Historical Archive. The archive covers measurements from as early as 1973 to 2014. The AMA for HAPs currently houses 49 million data records from over 2,700 monitoring sites. Approximately 85% of the measurements are from 2000 to 2014, as a result of air toxic programs, such as the 10-City Pilot Study, the NATTS Network, the PAMS Network, the IMPROVE Network, and the Urban Air Toxics Monitoring Program. Due to the size of the AMA for HAPs, the data have been split by state and year.

The AMA for HAPs data for each individual state are presented in zipped Microsoft Access databases. Simply click on the individual state in the map or the state name in the table below the map to obtain the data for that state.

Choose a state or territory from the map below or the list to the right. Alabama GO



https://www3.epa.gov/ttn/amtic/toxdat.html#data

2nd Assessment Status

- Updated equipment inventory through 2013
  - Need input for the 2014 equipment
- Calculated summary statistics
- Calculated pollutant dataset completeness (MQO 1)
- Assessed reported MDLs (MQO 2)
- Reviewed PT results (MQO 3)
- Calculated precision statistics (MQO 4)
- Applied MQO scoring routine

Example Calculation #1

MQO	Value	Meet MQO	Score	Wt
Completeness	95% based on 1-in-6 day schedule	Yes	4	1.6
Sensitivity	MDL less than Work Plan Target MDL	Yes	4	1.2
Bias	Within ±25%	Yes	4	0.8
Precision	≤ 15% CV	Yes	4	0.4

Total Score = (CS * CW) + (SS * SW) + (BS * BW) + (PS * PW)

Total Score = (4 * 1.6) + (4 * 1.2) + (4 * 0.8) + (4 * 0.4)

Total Score = 6.4 + 4.8 + 3.2 + 1.6

DATASET is "A-RATED"

Total Score = 16 (maximum score possible)

Example Calculation #2

MQO	Value	Meet MQO	Score	Wt
Completeness	80% based on 1-in-6 day schedule	No	3	1.6
Sensitivity	MDL 10% > Work Plan Target MDL	No	3	1.2
Bias	30%	No	3	0.8
Precision	20% CV	No	3	0.4

Total Score = (CS * CW) + (SS * SW) + (BS * BW) + (PS * PW)

Total Score = (3 * 1.6) + (3 * 1.2) + (3 * 0.8) + (3 * 0.4)

Total Score = 4.8 + 3.6 + 2.4 + 1.2

DATASET is "B-RATED"

Total Score = 12 (minimum score to be considered "suitable" for data analysis)

Example Calculation #3

MQO	Value	Meet MQO	Score	Wt
Completeness	90% based on 1-in-6 day schedule	Yes	4	1.6
Sensitivity	MDL 10% > Work Plan Target MDL	No	3	1.2
Bias	-11%	Yes	4	0.8
Precision	20% CV	No	3	0.4

Total Score = (CS * CW) + (SS * SW) + (BS * BW) + (PS * PW)

Total Score = (4 * 1.6) + (3 * 1.2) + (4 * 0.8) + (3 * 0.4)

Total Score = 6.4 + 3.6 + 3.2 + 1.2

DATASET is "B-RATED"

Total Score = 14.4 (minimum score to be considered "suitable" = 12)

Example Calculation #4

MQO	Value	Meet MQO	Score	Wt
Completeness	100% based on 1-in-6 day schedule	Yes	4	1.6
Sensitivity	No MDL Reported	No	0	1.2
Bias	10%	Yes	4	0.8
Precision	10% CV	Yes	4	0.4

Total Score = (CS * CW) + (SS * SW) + (BS * BW) + (PS * PW)

Total Score = (4 * 1.6) + (0 * 1.2) + (4 * 0.8) + (4 * 0.4)

Total Score = 6.4 + 0.0 + 3.2 + 1.6

DATASET is "DOES NOT MEET"

Total Score = 11.2 (minimum score to be considered "suitable" = 12)

Example Calculation #5

MQO	Value	Meet MQO	Score	Wt
Completeness	100% based on 1-in-6 day schedule	Yes	4	1.6
Sensitivity	MDL less than Work Plan Target MDL	Yes	4	1.2
Bias	42%	No	0	0.8
Precision	37% CV	No	0	0.4

Total Score = (CS * CW) + (SS * SW) + (BS * BW) + (PS * PW)

Total Score = (4 * 1.6) + (4 * 1.2) + (0 * 0.8) + (0 * 0.4)

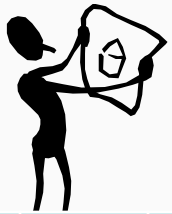
Total Score = 6.4 + 4.8 + 0 + 0

DATASET is "DOES NOT MEET"

Total Score = 11.2 (minimum score to be considered "suitable" = 12)

2nd Assessment Status

- 2nd Assessment: Total datasets evaluated = 4,786
  - A-Rated = 57%
  - B-Rated = 27%
  - Does Not Meet = 16%



- By Year:

Rating	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
A-rated	23%	40%	53%	53%	65%	62%	59%	68%	74%	47%	53%	50%
B-rated	17%	31%	24%	18%	18%	23%	28%	20%	18%	43%	36%	36%
Does Not Meet	60%	29%	23%	29%	17%	15%	13%	12%	8%	10%	11%	14%

A-rated and B-rated are considered suitable for trends analysis

NATTS DQO

- NATTS DQO: % Difference between Block 1 and Block 2 in the six-year Block
  - Calculate annual average by year
  - Assign Block ID for each site-annual year within a 6-year block
    - Block 1 = Years 1-3 (e.g., 2009, 2010, 2011)
    - Block 2 = Years 4-6 (e.g., 2012, 2013, 2014)
  - Calculate 3-year block averages from annual averages

2nd Assessment Status – A-rated data only

- Calculated 3-year block averages % Difference

Pollutant	# Sites	%DIFF
Beryllium (PM_{10})	6	-87.7%
Manganese (PM_{10})	2	-33.8%
Trichloroethylene	6	-32.7%
Lead (PM_{10})	1	-17.6%
Benzene	2	-15.6%
Naphthalene	15	-13.9%
Arsenic (PM_{10})	3	-10.6%
Tetrachloroethylene	5	-9.3%
Vinyl Chloride	5	-8.7%

Pollutant	# Sites	%DIFF
Chloroform	6	-4.9%
Carbon Tetrachloride	2	+0.1%
1,3-Butadiene	6	+1.8%
Acetaldehyde	9	+3.3%
Chromium VI	10	+3.6%
Formaldehyde	12	+11.8%
Cadmium (PM_{10})	6	+62.6%
Benzo(a)pyrene	0	NA
Nickel (PM_{10})	0	NA

2nd Assessment Status – A- and B-Rated Data

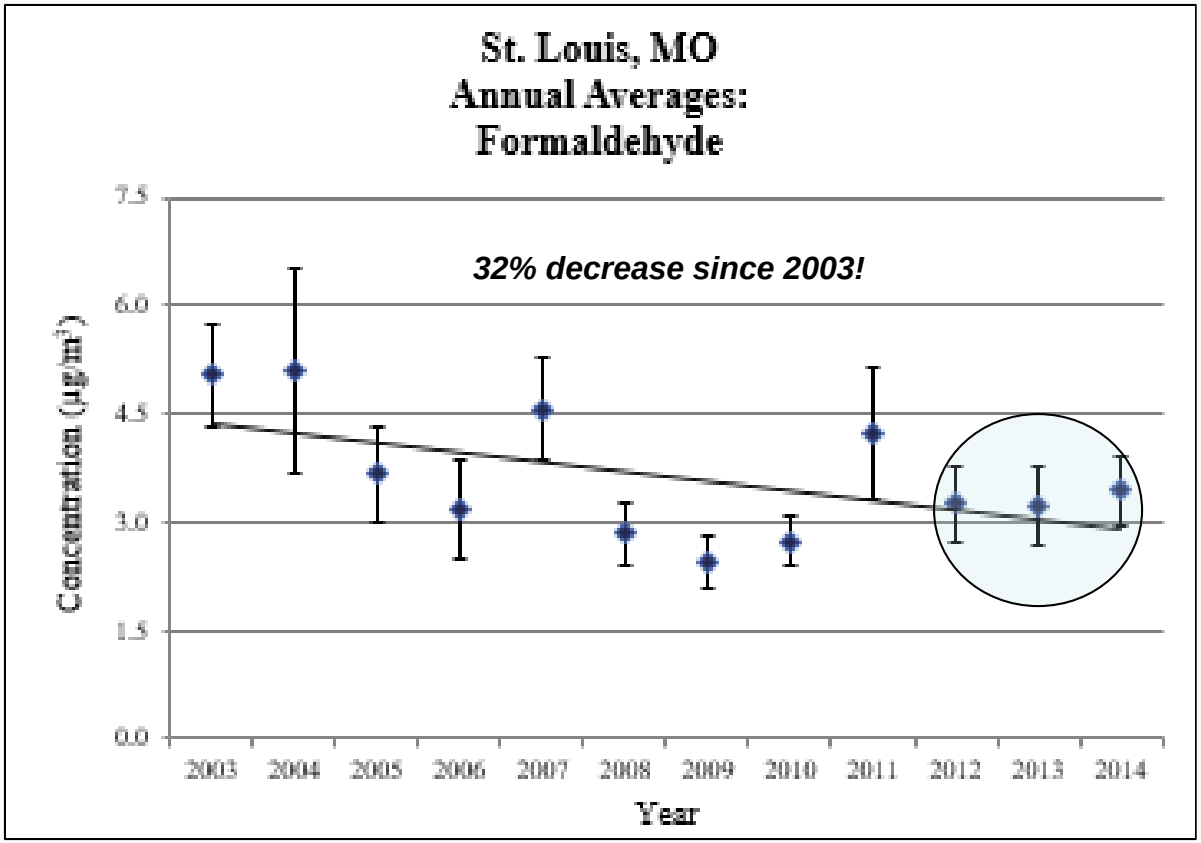
- Calculated 3-year block averages % Difference

Pollutant	# Sites	%DIFF
Beryllium (PM_{10})	22	-42.7%
Trichloroethylene	23	-34.2%
Benzene	19	-22.1%
Lead (PM_{10})	24	-15.5%
Naphthalene	22	-14.7%
Manganese (PM_{10})	24	-10.7%
Chromium VI	18	-9.5%
Chloroform	23	-8.7%
Tetrachloroethylene	16	-8.6%

Pollutant	# Sites	%DIFF
Nickel (PM_{10})	23	-4.4%
Acetaldehyde	22	-2.6%
Carbon Tetrachloride	16	-1.3%
1,3-Butadiene	17	-0.3%
Arsenic (PM_{10})	22	-0.1%
Benzo(a)pyrene	22	+0.7%
Cadmium (PM_{10})	24	+0.9%
Formaldehyde	25	+4.0%
Vinyl Chloride	16	+12.1%

2nd Assessment Status

- Example Annual Rolling Average



2nd Assessment NATTS Challenges

- Data reporting
  - Accuracy and timeliness
- Data Review
  - Invalidating data years after measurement taken
- Staff Turnover
  - Need for training; staff redundancy

2nd Assessment NATTS Challenges

- For at least 1 pollutant….
  - Completeness MQO:
    - In 2014, six sites did not meet this MQO for at least 1 pollutant
  - Sensitivity MQO:
    - In 2014, ten sites did not meet this MQO for at least 1 pollutant
  - Bias MQO:
    - In 2014, twenty-two sites did not meet this MQO for at least 1 pollutant
  - Precision MQO:
    - In 2014, twenty-five sites did not meet this MQO for at least 1 pollutant

Upcoming Activities

- Update NATTS emission source maps/data
  - Include 2011 NEI and 2011-2014 TRI
  - May include 2014 NEI (if available)
- Update NATTS site windroses
- Finalize annual, rolling 3-year, and multi-block averages.
- Prepare/finalize assessment report
- Prepare individual site reports

THANK YOU!

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