Joint Session of the NADP Subcommittees
Agenda for Tues. Sept. 27th 8:00-10:00 (updated 9/22/2005)

8:00-8:15 Welcome, announcements, and introductions
Kristi Morris, NADP Vice Chair

8:15-8:25 Approval of April 2005 Joint session minutes; review of Joint committee motions approved at June Exec. Committee
Karen Harlin, Joint/NOS Chair

8:25-8:30 June 2005 Executive committee actions related to equipment
Cari Furiness, NADP Chair

8:30-8:45 New raingages and minimum data reporting requirements
Van Bowersox, NADP Program Coordinator

8:45-8:55 Electronic field form update
Bob Larson, NADP Program Office

8:55-9:10 Deposition calculation changes
David Gay, Chris Lehmann, Bob Larson

9:10-9:25 Progress on Data Quality Objectives (DQOs) for NADP
Greg Wetherbee, QAAG

9:25-9:30 Update on Canadian Ammonia survey
Robert Vet, Environment Canada

9:30-9:50 Standing reports—major issues/highlights only
HAL Report, Bob Brunnett, HAL Director, Frontier Geosciences
CAL Report, Karen Harlin, CAL Director, ISWS

9:50-10:00 Highlights of agenda items for subcommittee meetings Tuesday (10:15-2:50)
NOS—Karen Harlin
DMAS—Bob Larson
Effects—Pam Padgett

10:00-10:15 Break

10:15-2:50 Subcommittee meetings

Attachment 2: Network Operations Subcommittee Attendees—September 2005, Jackson, Wyoming

Name	**Affiliation**
Rick Artz	NOAA, ARL
Dennis Lamb	Penn State University
Doug Disney	Frontier Geosciences
Natalie Latysh	USGS
Richard Kobe	Michigan State University
Mark Mesarch	SNR-UNL
Angela Zahniser	BLM
Bob Vet	Environment Canada
David Gay	NADP Program Office
Cari Furiness	NC State University
Bruce Rodger	Wisconsin DNR
Mike Kolian	EPA-CAMD
Scott Dossett	NADP Program Office/CAL
Gary Stensland	Dakota Science
Eric Prestbo	Frontier Geosciences
Jane Rothert	NADP CAL
Catherine Kohnen	CAL
Martin Risch	USGS
Chris Lehmann	NADP Program Office/ISWS
Kristi Morris	NPS-ARD
Greg Wetherbee	USGS
Karen Harlin	NADP Program Office/CAL
Van Bowersox	NADP Program Office
Mark Nilles	USGS
Leonard Levin	EPRI
Andrew Jackson	Texas Tech University
Rich Fisher	USDA Forest Service

NADP Vision

- Remain a premier research support project
- Serve data and information needs of scientists and educators
- Support informed decisions on air quality issues related to precipitation chemistry
- Respond to emerging issues

➢**Maintain an efficient measurement system**

→ Replacement ?

Belfort B5-780

Data logger acquires

Collector
10-sec: operating voltage
5-sec: status – open/close
Note – time to move from wet to dry status = 8-10 sec

Every 15 minutes
(1) minimum operating voltage
(2) number of cycles
(3) duration collector open

- 672 lines of data per week -

←

ETI NOAH IV

Data logger acquires
Gage
10-sec:
operating voltage
temperature (logger)
optical sensor status
precipitation depth
cumulative depth

Every 15 minutes
(1) minimum operating voltage
(2) duration sensor 'says' rain
(3) precipitation depth

- 672 lines of data per week -

←

ETI NOAH IV

Summary – 15 minutes

1 – precipitation depth
2 – duration collector open
3 – duration optics indicate precipitation is occurring
4 – number of collector cycles
5 – Vmin of collector & gage

←

ETI NOAH IV

Issues
1 – insect-related false positives
2 – power consumption at DC-solar sites
3 – SOPs
4 – repair/replacement procedures
5 – Prog Ofc prog

←

ETI NOAH IV

Data logger acquires

Collector

6-sec: status – open/close
Problem – 100,800 lines of data & logger capacity is 115,000 lines total

No channel for operating V

Q - How to determine Collector power?
Q - How to reduce file size?

Ott Pluvio

Data logger acquires

Gage
15-min:
operating voltage
temperature (logger)
precipitation depth
cumulative depth

Problem : Each variable is A separate file.

Q – Should we require a programmable data logger? Campbell 10X?

Ott Pluvio

Belfort B5-780

→ How to proceed with replacement ?

Vaisala VRG 101

Vaisala VRG 101 with MAWS 100

Raingage Comparison
(August – September 2005)

Date	NWS Stick	Vaisala	NOAH IV
8/19/2005	0.938	0.989	0.98
8/20/2005	0.459	0.465	0.46
8/22/2005	0.004	0.000	0.00
8/26/2005	0.028	0.025	0.02
9/14/2005	0.389	0.396	0.39
9/16/2005	1.694	1.715	1.71
9/19/2005	0.248	0.258	0.25
9/20/2005	0.452	0.458	0.44

Note: The Vaisala recorded three unidentified events totaling nearly three inches.

Proposed Change in Precipitation Calculation

D. Gay, B. Larson, C. Lehmann

Program Office

Problem

- an infrequent data problem occurring
- when no rain gage precipitation data is available AND the NADP bottle/bucket catch is not present or incorrect
- e.g.: hurricanes, where nothing is working

Current Calculation

- Current Deposition Calculation

$$Annual\ Deposition = \sum_{i=1}^{n} ppt * Conc_{wt.ppt}$$

ppt = total annual precipitation measured (sum of subppt)

$Conc_{wt.ppt}$ = the precipitation weighted mean concentration from valid samples.

Therefore

- Any misreported or missing precipitation value

is very influential and important

Currently

- if the NADP recording raingage value is not available,
- Then we use the bottle/bucket catch to calculate precipitation depth (subppt).
- If bottle/bucket catch is also suspect, then another onsite gage is used as an alternate precipitation value.

- If no alternative onsite gage (or very close), then no precipitation is available and does not enter the deposition calculation
- Example: Hurricane in Florida
  - Possible 20 inches of rain missing…

Our Proposal (for all networks)

- When both the rain gage and collector unreliable for estimating precipitation amounts:
- 1. Then site liaison contacts site for onsite gage or other bottle catch (ex: collocated MDN or NTN)

- 2. If unavailable, then a rain gage within 400 m (~1/4 mi) of the collector (stick gage, weighing recording raingage, or tipping bucket) is used.
- 3. If unavailable, the PO will use precipitation depth from a Cooperative National Weather Service gage (COOP) deemed appropriate, using
  - the closest appropriate single gage within 10 km of the site, or
  - All gages within 30km will be averaged, using a cubic distance-weighted average to "estimate" the precipitation at the site,

- 4. If no gages are within 30 km,

  then the PO will allow the precipitation to remain missing, and normal data completeness and map inclusion rules apply.

This Proposal does these things

- Clarifies how alternate rain gage data is obtained for all networks
- Increases the options we have to obtain precipitation data, particularly for severe conditions
- Does Not provide a precipitation value for all conditions

DISCUSSION??

Developing Data Quality Objectives for the National Atmospheric Deposition Program

Greg Wetherbee (USGS)
wetherbe@usgs.gov

QAAG Members

- PO (C. Lehmann, D. Gay)
- USGS (G. Wetherbee, N. Latysh)
- CAL (J. Rothert)
- HAL (B. Brunette, G. van der Jagt)
- State of MD (J. Sherwell)
- CASTNET (M. Stewart)
- US EPA (M. Kolian, G. Lear, S. Faller)

GOALS

Ensure that data continue to meet the needs of the research community

Provide benchmarks/indicators to maintain data quality

QAAG Approach

Evaluate Data Quality Indicators (DQI)

- Representativeness
- Uncertainty
- Completeness
- Sensitivity (Resolution)

QAAG Approach

- Use Data Quality Indicators (DQI) as warning signals ONLY.
- Not meeting DQIs does not necessarily imply "bad data".

Representativeness:

the degree to which the sample data accurately represent the characteristics of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

QAAG will work with EROS (formerly Env. Effects Subcomittee) on this.

Uncertainty:

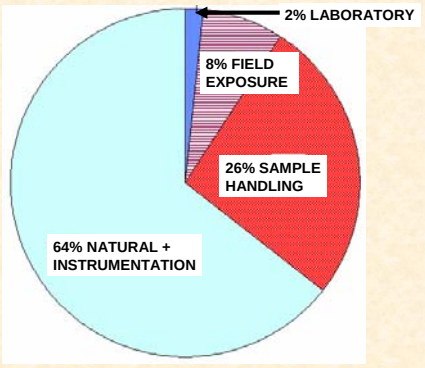
the combined variability and bias in the data due to random or systematic effects.

Variability: a measure of mutual disagreement among individual measurements, expressed generally in terms of the standard deviation.

Bias: the systematic or persistent distortion that causes errors in one direction (i.e., the expected sample measurement is consistently either higher or lower than the sample's true value).

MEASURE OVERALL VARIABILITY USING USGS CO-LOCATED SAMPLER PROGRAM

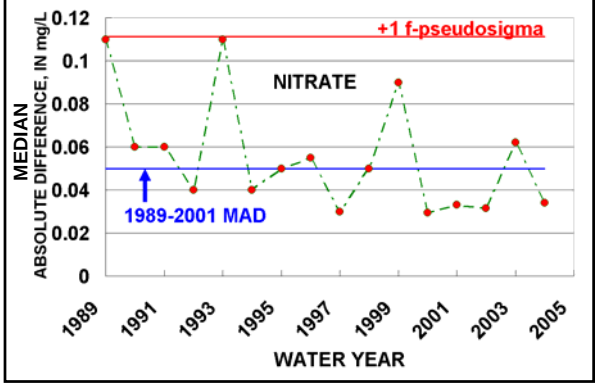
Error in 2003 NTN Measurements



Question:

How can we evaluate uncertainty in NADP data on an ongoing basis?

EXAMPLE OF ONE APPROACH



Question:

Can we link an uncertainty DQO to our ability to detect trends?

For example:
Can we specify the maximum uncertainty tolerable to quantify a 1%/year trend with 90% confidence?

Answer:
Maybe, but the math gets fun.

Completeness:

a measure of the amount of valid data obtained from a measurement system compared to the amount that was possible, provided SOPs are followed.

Existing Completeness Criteria

1. **VALID SAMPLES: TIME REPRESENTATIVENESS.** There must be valid samples for at least 75% of the period (39 weeks on an annual basis).

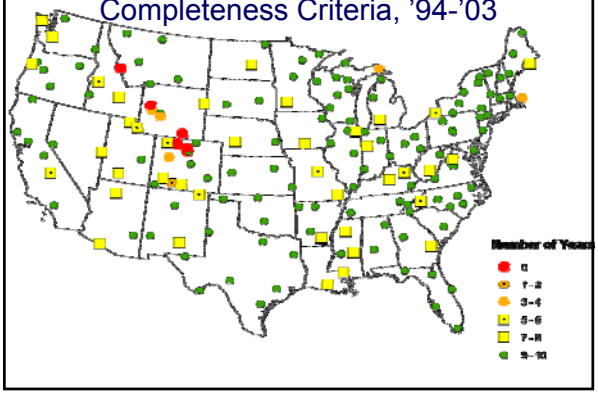
2. **SITE OPERATING TIME.** The site must operate no less than 90% of the period (47 weeks on an annual basis).

Existing Completeness Criteria

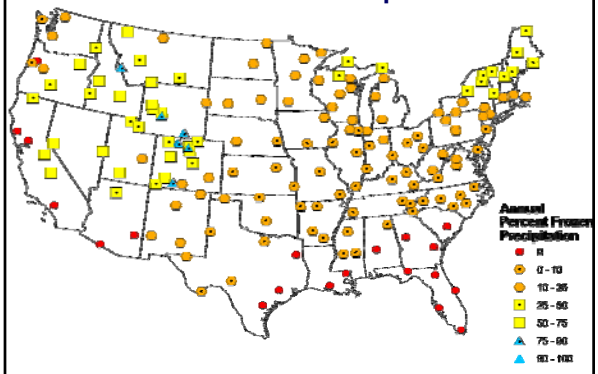
3. **VALID SAMPLES: VOLUME REPRESENTATIVENESS.** The volume represented by valid samples during the period must represent at least 75% of the precipitation reported.

4. **COLLECTION EFFICIENCY.** The volume represented by all samples collected during the period must represent at least 75% of the total precipitation measured by the recording raingage.

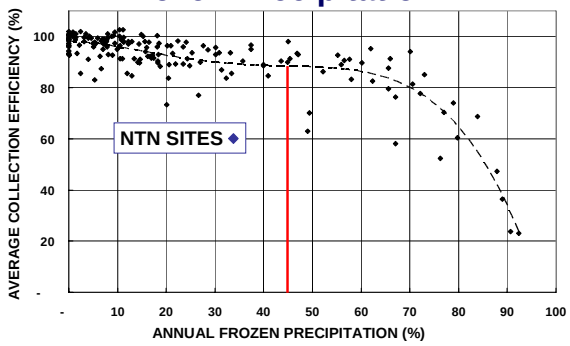
NTN Sites Meeting All Completeness Criteria, '94-'03



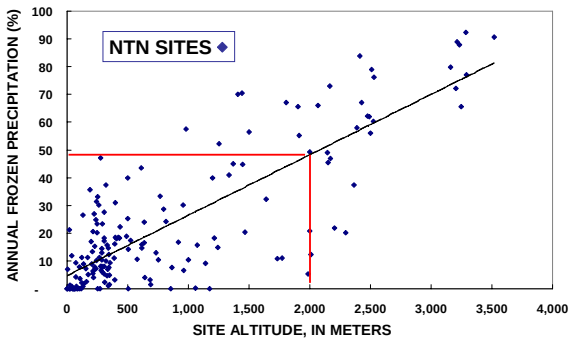
Percent Frozen Precipitation



Collection Efficiency vs. Frozen Precipitation

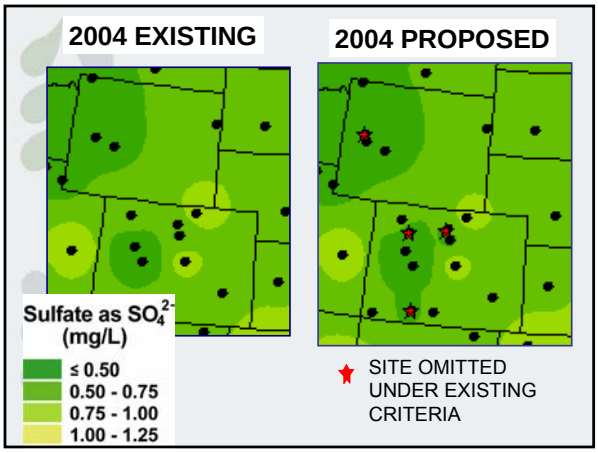


Frozen Precipitation vs. Altitude



Recommendations

- **Change NADP Criterion**
  - **Original criterion:**
    Collection efficiency ≥ 75%
  - **Proposed change:**
    Collection efficiency ≥ 75%,
    ≥ 50% for sites above 2,000 m

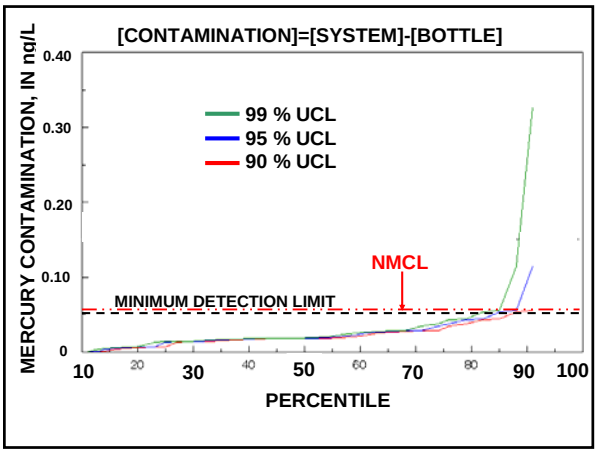


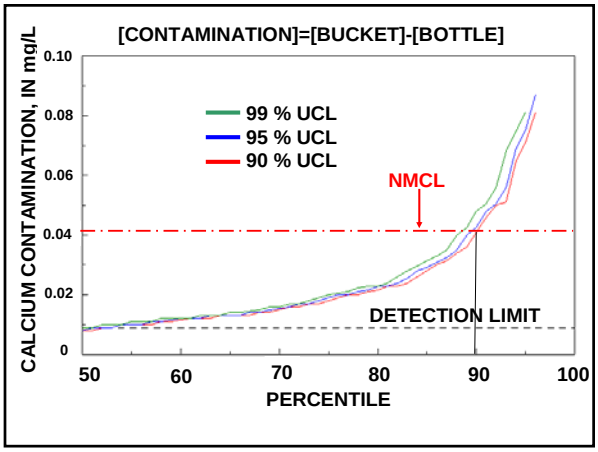
Sensitivity:

the measurement resolution provided by data-collection methods and instrumentation to distinguish between signals of interest and noise (i.e., error).

Network Maximum Contamination Limits (NMCLs)

- NMCLs based on USGS Field Audit and System Blank data (historically tied to laboratory det. limits)
- Statistical Confidence to distinguish between environmental signals and noise
- Proposed approach to set Network Detection Limits based on real data, independent of analytical capability





QUESTION:

- **Are NTN samples containing more contamination that is reducing sensitivity?**

NMCLs

3-Year Period	Calcium NMCL	Calcium NTN Ptile[2]	
1997-1999	0.055	27	+2%
1998-2000	0.056	25	-1%
1999-2001	0.056	24	+10%
2000-2002	0.035	14	-4%
2001-2003	0.030	10	+7%
2002-2004	0.041	17	

Current MDL=0.002 mg/L

Sensitivity Decision Rule #1

- Annually compute 3-year NMCLs
- Compare NMCLs to NTN and MDN percentiles
- Decision Rule: If ≥10% increase in NMCL equivalent network percentile compared to previous 3-year period, then investigate possible sources of decreased sensitivity.

NMCLs

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2002-2004	0.041	17	

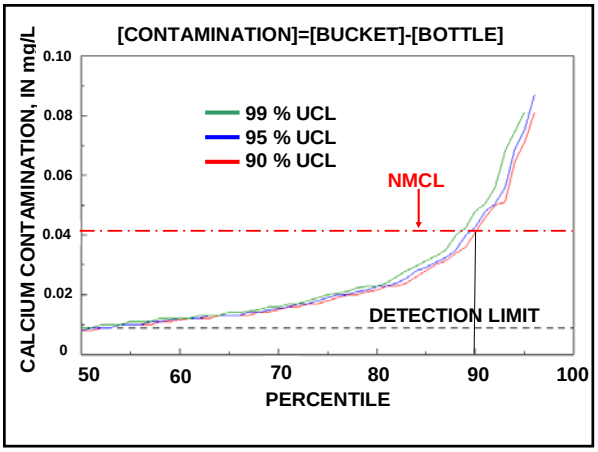
Current MDL=0.002 mg/L

QUESTION:

- **Are the analytical laboratories meeting the network's needs to quantify low-level concentrations?**

Sensitivity Decision Rule # 2

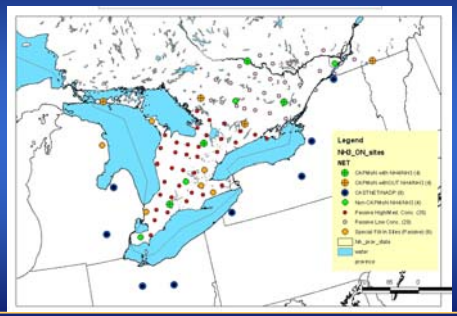
- Annually compare NMCLs to analytical MDLs
- If the NMCL is at least 2 times the ending year MDL, then the sensitivity of NADP analytical measurements shall be considered acceptable.
- Consistent with Oblinger-Childress and others (1999) who advocate reporting a Laboratory Reporting Limit (LRL), which is 2 times the MDL to avoid reporting false negative results.



THE PLAN

1. **DQO decision rules for all DQIs by end of November, 2005.**
2. **Draft DQO document by January 1, 2006 for Joint Committee review.**
3. **Seek approval for DQOs at spring 2006 meeting.**

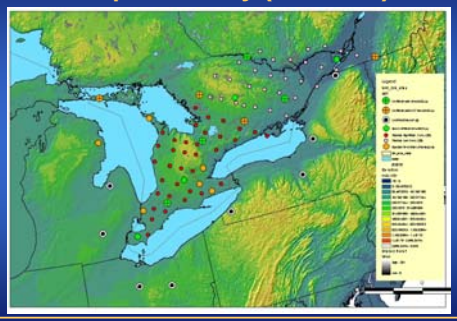
Southern Ontario Ammonia Passive Sampler Survey (SOAPSS)



Environment Canada Environnement Canada

Meteorological Service of Canada
Service Météorologique du Canada

Southern Ontario Ammonia Passive Sampler Survey (SOAPSS)



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