

2020 NADP Virtual Spring Business Meeting: Network Operations Subcommittee Meeting Minutes May 13, 2020 2:30–5:00 ET/1:30-4:00 CT/12:30–3:00 MT/11:30–2:00 PT

1. Welcome and approval of Fall NOS Minutes (Melissa Puchalski) 2:30 – 2:35 PM

MOTION: Approve Fall 2019 minutes, Richard Tanabe so moved. Greg Wetherbee seconded. **Motion passed.**

2. ECCC Hg Passive Pilot Study (Sandy Steffen) 2:35 – 2:40 PM

Sandy provided an update on the passive monitoring study. Objective is to fill information gaps on a global scale. Passive samplers are deployed for 3-month periods (quarterly). Five NADP sites included in this study. Analysis of samples delayed due to COVID-19.

DB: Species of Mercury capture? A: Gaseous elemental Hg.

WL: Beltsville 1/2Q combined samples.

DS: What's the plan for the data? A: Plan to send out data to all. System will house data in Canada and made publicly available.

EP: University of Toronto has done a lot of work for this effort. We did an Inter-comparison study using 100 samples between Tekran and Merpas split between Toronto and Italy. The samples were over multiple time periods. A second inter-comparison between CNR and IBL samplers also occurred. Results from both studies were very good.

3. Update on Dry Side Bucket Dust Collection (Janice Brahney/Greg Wetherbee) 2:40 – 2:50 PM

Project goals: find an alternate method to marble, bulk, or dust on snow sampling for dry dust deposition, conduct a field study to test the sampler, and examine composition of dust broadly and specifically for bioavailable nutrients. Dust on snow was much greater than on the dry side buckets. Used 15 NADP sites and compared to IMPROVE data. Co-located sites had good agreement. Proximal sites compared well but not as good as co-located. Good results reflecting the quality of the sampler. Results have been published in Aeolian Research <https://www.sciencedirect.com/science/article/abs/pii/S1875963720300513>. Plans to redesign the sampler without the use of glue. Continue work on dust compositions using 2.5 years of data.

DG: Unglued sampler, a friction fit? A: It's all welded together.

GW: Status of phosphorus on particulates? A: One site has been analyzed. There were differences in the bioavailability of phosphorus fractions...saw differences regionally.

4. NADP Site Survey Report (Eric Hebert) 2:50 – 3:00 PM

Visited 34 locations. Total 42 collectors (28-NTN, 14-MDN). 35 primary rain gauges. Eric presented pictures showing a variety of site issues: corrosion, siting, and equipment issues. N-CON lip/lid liner issues as well. Many site operators aren't requesting new lid liners.

Percentage of collectors requiring adjustments per year due to poor lid seal for N-CON's increased: there was a 1/4" gap between lid and bucket. The fix was to install a grey plastic cross that sits over the motor box occupying the gap between the lid and the motor box.

Another accomplishment was the set up the transfer of data/photos/videos to EPA OneDrive thanks to Tim Sharac

WL: Heating times activate sensor (blue/orange bars)? A: Those are separators for time scale.

DG: NTN N-CON motor box piece? Hold motor more stable. A: That's why we installed the gray plastic cross piece so that it sits over the motor box and occupies the space between lid and motor box.

RT: The N-CON's in the NED have the 3D printed plastic crosses to hold the motor box in place.

Donna S: N-CON specs? RT: The N-CON's ship with the plastic crosses. Also, we need to provide instructions on how to adjust the lid once the cross is in place.

GW: Re: Corrosion. Desiccant cartridges for NOAH IV's? A: They would be used up quickly.

GH: Are we sending out reminder to operators to make sure to check equipment more carefully? RT: Reminders goes out throughout the year with the regular NTN data reports.

DG: We should send out photos for examples of issues to the operators.

GW: We need to provide feedback to site operators when there's problems. RT: I will reach out to the site operators.

CD: Potentially a long delay between event and analysis.

BL: Ask Zach and Dana. Precipitation data looked at as it comes in.

ZN: For better effectiveness: the equipment/site issues as shown by Eric's photos should be added to our social media sites.

Dana G: We are looking at data within a month of the data's arrival at the CAL, then we contact RT to have him inform site operators of any issues.

GW: This means that if the data are not being reviewed in a timely manner, then collectors that are open too long could be causing samples to be invalid due to more than 6 hours of dry exposure. However, we might not know about it until it is too late. If too many samples are invalid, then the site's data will not meet completeness criteria for the annual maps.

MP: Is this a DMAG issue? No answer.

BL: Operators can't necessarily do the work to fix issues. RT: Site operators aren't always submitting data same time samples are collected. Bulk submitted instead.

GW: Greater than 3 years between site audits is a problem.

The Program Office will:

- a. Write a script to identify when precipitation is present, the collector event recorder is logging time (it's open). Data will be flagged and the PO will address the problem directly with the Site Sponsor and Operator.
- b. Meet quarterly with EEMS to identify problems and needed improvements
- c. Create a "siting criteria" help sheet including picture of what the site should and should not look like. They will include the help sheets in the bucket boxes.
- d. Look into the NCON NTN lid seal rigidity issue to identify if there is a problem.
- e. Purchase or create a widget that will hold the NCON NTN motor in place to create a better lid seal.

5. USGS Next Generation Observing Systems (Mike McHale) 3:00 – 3:15 PM

DB: MM is out in the field so he's not able to present his update. USGS has installed meteorological sensors at NY68, including a flux tower. USGS contemplating funding two additional NGWOS sites in the Delaware river basin during FY20. Future plans include ten additional basins with the Upper Colorado river basin being next on the list.

6. USGS External QA Report (Greg Wetherbee) 3:15 – 3:25 PM

H-ion issues: positive H⁺ concentration bias for lower pH samples. Natural samples looked good. CAL's median relative standard deviation for duplicate samples was <10% for all analytes indicating good precision. NH₄⁺ data look excellent. NO₃⁻ also looked excellent. Variability and bias: H-ion=203 for fps ratio percentage. Ca bias was statistically significant. Field audit sample contamination: both Nitrate and Calcium were negatively affected...overall, contamination is down for every constituent. Bags compared to overall sample contamination/stability indicated no issues. NUANC sites are only ones using bags.

HAL interlaboratory comparison program was suspended due to COVID-19. HAL control chart: a slight negative bias. Percentage differences +/- 5-10 %.

Future plans include significantly reducing the scope of both NTN and MDN inter-lab comparison QA programs in January 2021 and eliminating NTN field audit (sample contamination and stability); and MDN system blank (sample contamination and stability). June-Sept 2021: resurrect a 3 or 4 station NTN co-located sampler program to estimate overall variability for NTN. For FY21: finish/publish urban deposition research results. For FY22, work halftime for NADP QA in October 2021, which will include coordinate co-located sampler problem, implement new NADP monitoring methods, and participate in QAAG.

GW: Concerned about budget. GW and DB need to discuss further. DB needs to talk to management further. Hard to justify continuing programs because they give people the assurance of quality control, but meanwhile the results are ignored instead of being used.

General consensus that the external QA program is important to overall network/data quality. Need to prioritize program needs based on future budgets.

7. Equipment Update (Mark Olson) 3:25 – 3:35 PM

Current network configuration: NTN=266 (Aerochem=158, N-Con=108). MDN=88 (AC=50 NC=38). Precip=299 (ETI=185, Ott=100, Belfort=14 (being replaced with Ott Pluvial II 15)). AMoN=108 (no equipment issues with potential for expansion). AMNet plenty of equipment we just need experienced operators. AMNet consumables are expensive. We need to have an SOP to clarify what PO will support and what it won't. Litterfall=176 collectors in stock.

Arboretum (WI06) includes NTN, MDN, AMoN, and Precipitation. Eagle Heights (Supersite) will have 3 rain gauges (comparisons), 4 NTN samplers, 2 MDN samplers. Need to look at an alternative (KJJ-samplers) to the N-CON samplers since Aerochem doesn't exist anymore.

Currently recruiting for the site liaison position.

CQ: Relative costs for the KJJ sampler? A: Very comparable.

GW: Eric Hebert, didn't you email that this collector is a version of a 1980s vintage Anderson wet/dry collector that uses a 7-grid sensor that we don't like? EH: Yes, it has a screw-drive motor that they are calling a linear actuator, and it has a 7-grid sensor just like the MDN ACM. They never lasted very long. GW: We tested linear actuator motors in extreme conditions at CO02, and they froze up on us. So, haven't we been down this road before? A: Silence.

MOTION: PO will purchase the KJJ sampler and co-locate it with the Aerochem/N-CON/Canadian sampler at the Eagle Heights site (Mark Olson moved). Winston Luke seconded. Greg Wetherbee only No vote. **Motion passed.**

8. Low-power collector modification (Bob Larson) 3:35 – 3:40 PM

No update.

9. MDN/AMNet Update (Mark Olson) 3:40 – 4:05 PM

MDN=85 sites, overall doing well but lost 8 sites in 2019. IL11 and WA18 are surplus equipment. AMNet=13 sites. Mark performed 6 AMNet site visits in 2019, zero in 2020. The 2017 and 2018 QA reports are out for review currently. 2019 QA report waiting on MD08 data. AMNet data have been reviewed but need to be merged with the field notes and then published online. Expansion of passive samplers should be considered.

Ad Hoc committee in MELD to look at reviving MDN.

WL: Barrow install on hold, but NOAA still part of AMNet.

10. AMoN Update (Camille Danielson) 4:05 – 4:25 PM

2015-2020, 98-99% valid AMoN samples (however, on the high side). Downward trend in travel blank NH_4 concentrations 2007-Dec 2019. Supply QC: only 2 samples out of 583 exceeded criteria in 2019. New MDL's: Lab $\text{MDL}_l=0.013$ mg/L (2019=0.016), Network $\text{MDL}_n=0.083$ (2019 0.104). Issue: AMoN field forms percentage of leaf cover and meteorological observations...should these fields be removed as they are not used? The gap report for missing AMoN samples was resolved 2/2020. (MDN/NTN have these).

Questions/Observations

- User notes codes...how are they using QR codes?
- Invalid AMoN data: QR=C. Are users pulling this bad data?
- Sample ID's are not on website.
- Notes codes-qualifying data need to be reviewed.
- Sampler deployment times are inconsistent: one day to one year is a problem.
- Data quality objective summit will occur mid-Summer 2020. We need participation from the broad NADP/non-NADP community.
 - Looking to revise the entire QA process.

For the future: data qualification, access to prepared sampler storage, deployment time, and sensitivity of ammonia uptake by Radiello to ambient temperature will be examined.

DG: Should be consistent across all networks concerning codes.

11. Bag Sampling Update – NTN (Chris Worley) 4:25 - 4:40

For Nitrate, Ammonium, and Phosphate: high/consistent analyte recoveries in buckets. Low/inconsistent recoveries from bags. We wanted to characterize problem: bag particulate concern causing problem? Bags were dirty? Composition of bag? Canadian bag had a much better percent recovery than bucket or NADP bag (polyethylene). Looked at bag section cutouts. That effort yielded no loss of nitrate, nearly completely loss of phosphate, and a complete loss of ammonium. Despite test results, still in the best interest of NTN to use bags. The CAL would like to pursue the alternate option of using the Canadian-style Mylar-composite bags. CAPMoN is already using these bags. The bag is roughly twice as expensive as the polyethylene bag but NADP would still realize a substantial cost savings.

GW: We already approved the NADP bags. CAL spent \$5K on these bags that are now going to be thrown away. We have 3, going on 4, years of record at several NTN sites in CO and 6 years of AIRMoN data collected in these bags. Greg attempted to convince NOS that the

USGS Field Audit data indicate less loss of nutrients from the bags than the buckets. The losses observed around the detection limit are meaningless because the concentration values are in a range of high uncertainty per the Field Audit results; affecting only the lower 5 percent of NTN concentrations. Concerned about spending more money on these bags as NADP costs are going up when this is just in the noise of the data.

DG: A benefit of using bags: no longer have to ship buckets back to NADP.

MOTION: PO/CAL will switch to the to the Canadian-style mylar/polyethylene bags assuming three conditions are met: 1) Nutrient losses are less than the NTN MDL, 2) Acceptance on approved bag quality language in the vendor contract, and 3) If the previous two conditions are not met, then the PO will proceed with the original polyethylene bag roll out. Schedule: June/July 2020 for approved vendor language. August/September 2020 for first bag from contractor. September/October 2020 for staggered rollout of bags to sites. Eric Hebert seconded. Greg Wetherbee was only No vote. **Motion passed.**

12. Litterfall Update (Doug Burns) 4:40 - 4:55 PM

Tabled to Joint Subcommittee Meeting due to going over time.

13. Wrap-Up (Melissa Puchalski) 4:55 – 5:00 PM

Participant List

<u>First Name</u>	<u>Last Name</u>	<u>Affiliation</u>
Kulbir	Banwait	ECCC
Greg	Beachley	USEPA
Katie	Benedict	CSU
Sarah	Benish	UMD
Katie	Blaydes	WSLH
Janice	Brahney	USU
Doug	Burns	USGS
Tom	Butler	Cornell
Roger	Claybrooke	USGS
Amanda	Cole	ECCC
Catherine	Collins	USFWS
Christa	Dahman	WSLH
Camille	Danielson	WSLH
Ed	Eberhardy	NPS
Cari	Furiness	NC State
David	Gay	WSLH
Dana	Grabowski	WSLH
Michael	Harwood	ECCC
Eric	Hebert	EEMS
Selma	Isil	WOOD

Nathaniel	Javid	WSLH
Maria	Jones	EEMS
James	Kuchta	ECCC
Bob	Larson	WSLH
Winston	Luke	NOAA
Mary	Lynam	UMichigan
Taylor	Macy	USEPA
Amy	Mager	WSLH
Ryan	McCammon	BLM
Kevin	Mishoe	WOOD
Kristi	Morris	NPS
Zac	Najacht	WSLH
Alexander	Nyhus	WI DNR
Jason	O'Brien	ECCC
Mark	Olson	WSLH
Erin	Pierce	WSLH
Eric	Prestbo	Tekran
Melissa	Puchalski	USEPA
Bill	Richardson	Sac and Fox Nations
Chris	Rogers	WOOD
David	Schmeltz	USEPA
Donna	Schwede	USEPA
Martin	Shafer	WSLH
Tim	Sharac	USEPA
Rodolfo	Sosa	UNAM
Sandy	Steffen	ECCC
Marcus	Stewart	WOOD
Cheryl	Sue	ECCC
Naomi	Tam	AB ENV
Richard	Tanabe	ECCC
John	Walker	USEPA
Anthony	Ward	WOOD
Greg	Wetherbee	USGS
Kirsten	Widmayer	WSLH
Chris	Worley	WSLH
Kenny	Yan	ECCC
Na	Zhang	WSLH