

Network Operations Subcommittee (NOS) Meeting Minutes
2019 NADP Fall Meeting
November 4-8, 2019
Boulder, CO

NOS Chair: Richard Tanabe (NADP Program Office)
Vice Chair: Melissa Puchalski (USEPA)
Secretary: Winston Luke (NOAA)

Tuesday November 5th

Agenda

10:15 Motion to approve minutes from Spring 2019 (Madison) meeting - Richard Tanabe
10:20 AMNet Update – Mark Olson
10:30 Mercury Passive Sampling – Richard Tanabe
10:40 AMoN Update – Camille Danielson
10:50 USGS External Quality Assurance Report – Greg Wetherbee
11:00 Site Liaison Update – Richard Tanabe
11:10 Bag Sampling Analyte Issue – Chris Worley
11:20 WI/WD Proposal – Camille Danielson
11:35 USGS NGWOS NY68 Update – Mike McHale
11:50 NOS Secretary: Nominations & Election – Melissa Puchalski
12:00 Adjourn

Welcome and call to order by Richard Tanabe at 1020

1. Approval of NOS minutes from NADP Spring 2019 meeting (Madison, WI) - Richard Tanabe
Motion: Camille Danielson motion to approve, second by Melissa Puchalski. Approved.
2. AMNet Update - Mark Olson (WSLH, NADP Program Office)
 - 15 sites currently in network
 - In the last 12 months, lost Denali National Park (AK03), Boston Univ. (MA22), Kejimikujik National Park (NS01), and Horicon Marsh (WI07)
 - In January 2020, Bondville (IL11) and Indiana Dunes (IN34) will close
 - During the Mercury in the Environment and Links to Deposition (MELD) ad hoc meeting the discussion focused on a negative GOM bias discovered in the presence of water vapor and ozone
 - As a result, many sites are transitioning from full speciation to GEM-only sites.
 - AMNet is staying afloat but looking for direction from MELD to maintain the network.
 - NADP Instrumentation update
 - Due to site closures, equipment has been acquired by the Program Office (PO). NADP is providing speciation systems at Bondville (IL11) and Clifty Falls (IN21).
 - Bondville has lost funding and will close in 2020
 - NADP is providing GEM-only analyzers at Leech Lake (MN06), Boston (closed, MA22) and Indiana Dunes (will close at the end of 2019, IN34).
 - Equipment is still available
 - Site visit update
 - Due to the HAL transition, there were only four site visits in 2019 (HI00, OH02, OH52, IL11)
 - MS12 site visit is overdue
 - Jesse Wouters is being trained as a new AMNet Site Visit Site Liaison, responsible for site audits
 - Along with Mark Olson, he will visit NJ30 and NJ54 on December 8, 2019
 - Training
 - Wisconsin Dept. of Natural Resources (WDNR) audit training will occur at Horicon Marsh, Dec. 2019.

- WDNR SciOps 2537X training occurred Jan. 2019
- OHO2 (new) operator training occurred April 2019
- WSLH data validation position assumed by Muge Kafadar, assistance being provided by David Gay
- Mark Olson is transitioning away from AMNet
- AMNet Data Availability
 - All of 2018 data is available on the web site
 - Currently working on 2019 data review
- AMNet Documents
 - *2017 QA Plan* is ready for review
 - *2018 QA Plan* has not been started
 - *AMNet Data Manual* has been updated to include QR Codes (A, B, C). Manual still needs 2537X updates.
 - *Evaluation of AMNet Equipment* is ready for review
 - *Operators Manual* has been updated with 2537X and is ready for review
- Asia Pacific Mercury Monitoring Network (APMMN)
 - Dr. Suzuki's group at the National Institute for Environmental Studies (NIES) is interested in adopting the AMNet QA Program (developed in 2009). AMNet QA protocols are used by GMOS as well
 - Mark will stay involved in the international effort
 - He will install a Tekran GEM system in Jakarta, Indonesia
 - A workshop was held there in August 2019
 - At that time, Mark visited the U.S. Embassy in Jakarta where the GEM analyzer will be installed early 2020.
- Open forum for discussion
 - AMNet is down to 15 sites, and will be at 13 in 2020
 - Does the community need to discuss future options?
 - Should NADP focus on GEM, given the cost and complexity of full speciation?
 - Expand monitoring activities internationally?
 - Pursue a passive sampler network?
 - Other suggestions?

Discussion:

Sandy Steffen (Environment & Climate Change Canada; ECCC) pointed out the need for continued speciation measurement for model evaluation and assessing dry deposition model results. Although she is a proponent of a GEM passive sampler network, Sandy asked – how does AMNet communicate this continued need for speciation measurements to partners? How do we encourage the current AMNet participants to continue?

Mark responded – we do not discourage or encourage speciation measurements, but are happy that the measurements, in whatever form, are continuing. The sponsors are assessing the cost and level of effort which is driving the decision to discontinue sampling.

3. Mercury Passive Sampling Proposal– Richard Tanabe, (NADP Program Office).
 - Sandy Steffen (ECCC) reached out to NADP with a proposal to establish a pilot study of passive samplers for atmospheric mercury at select NADP sites.
 - Purpose:
 - Environment and Climate Change Canada is leading a 2-year Pilot Study to investigate deploying passive samplers globally
 - To collaborate with currently operating air monitoring networks to initiate or continue atmospheric mercury monitoring using passive sampling technology - a network of networks.
 - Pilot Study to support global monitoring to feed into obligations under the Minamata Convention on Mercury
 - More details will be presented in the Technical Sessions

- Sandy Steffen - Thursday, Session 7: 14:10
 - “Passive air sampling for mercury on a global scale to fill the gaps – a Canadian led pilot study”
- Eric Prestbo – Thursday, Session 7: 14:30
 - “Network Implementation of a Mercury Passive Sampler (MerPAS) Method: Overcoming Technical and Quality Assurance Challenges”
- Current Measurement Sites
 - Environment and Climate Change Canada – Atmospheric Mercury Measurement (ECCC-AMM) network.
 - Northern Contaminants Program Passive Air Sampling Network in the Canadian Arctic
 - Global Atmospheric Passive Sampling (GAPS) network (23 sites)
- Current Collaborations
 - Latin American Passive Air sampling Network (LAPAN),
 - Asia Pacific Mercury Monitoring Network (APMMN)
 - Biodiversity Research Institute sites in the Caribbean
- Filling in the Spatial Gaps with New Collaborations
 - National Atmospheric Deposition Program (NADP),
 - European Monitoring and Evaluation Programme (EMEP),
 - Arctic Monitoring and Assessment Programme (AMAP)
 - Global Mercury Observation System (GMOS)
- Sampler - MerPAS
 - Sampler developed by University of Toronto – Scarborough. Commercially available from Tekran
 - Sulfur-impregnated activated carbon as the sorbent for mercury.
 - The carbon is held in a mesh tube that is placed inside a radial diffusive barrier.
- Installation
 - No power required
 - Brackets mount to any post
- Sampler Operation and Analysis
 - Mercury undergoes diffusive uptake and accumulation on the sorbent, with the sampling rate being tightly controlled by the diffusive barrier.
 - Analysis by thermal combustion and atomic absorption detection.
 - Analysis will be done at the ECCC Mercury Research Laboratory.
- Sampling Logistics
 - Three-month sampling periods
 - Two samplers, one Blank (per sampling period)
 - ECCC will cover all costs of samplers, shipping, receiving, and analytical costs

Motion: NADP will allow Environment and Climate Change Canada (ECCC) to deploy mercury passive samplers at no cost to NADP for a two-year period. The NADP Program Office will provide a letter of invitation to selected sites (3-5) to participate in the ECCC Pilot Study.

Moved by Richard Tanabe, Mark Olson second. Motion approved.

3. AMoN Update –Camille Danielson (WSLH, CAL QA Manager)

- Recent AMoN Changes
 - 107 AMoN Sites
 - 4 new sites this year with additional sites expected in coming years
 - Prep 180 samplers 26 times per year (each deployment)
 - Some sites request triplicates and/or travel blanks for every deployment (extra cost to site)
 - Analysts

- Rotation to new AMoN analyst in March – April Grant
 - Beginning cross-training for 2020 – Marie Assem; Katie Blaydes will begin in 2021
 - WSLH now has good coverage for all the preparation and analysis of samplers
- Moved to larger lab – Room 200B
 - New lab is just as clean (low background NH₃) as the old lab, but much more space
- Completion of analytical & prep method SOPs
- Refinement of sample qualifiers/data review
- Method Development
 - Experiments assessing Radiello® permeability
 - Ongoing testing at WI06
 - Validating extended calibration curve to decrease dilutions (summer ~10 dilutions/day)
 - Multiple comparisons complete – data assessment needed
 - Lower Dynamic Range is 10 mg/L – extend to 6.4 mg/L
 - Anti-static bag studies completed
 - Comparable or better but not significant cost advantage at this time
 - Efficiency improvement
 - Custom-made rack topper approved after QC testing
 - Decreases sampler prep time by several hours per prep week
- Travel Blanks & Triplicates, 2018-2019
 - Travel blanks and triplicates constitute the main field quality control for AMoN
 - > 25 % of sites receive travel blanks (TB) each deployment week (26)
 - Rotates - all sites get ~3-4 TBs/year
 - 12 months data yield 650 valid TBs; None were over the criterion (0.2 mg/L)
 - Only 9 TB over 0.1 mg/L (1.4%)
 - Mean TB = 0.037 mg/L NH₄ (equivalent to ~0.074 µg/m³)
 - > 12.5% of sites receive triplicates per deployment (currently about 15% of sites)
 - Rotate - all sites get ~2-3 triplicate sets/year
 - 10 months of data for WSLH (triplicates began in Aug 2018)
 - N = 297 Sets assessed
 - Excellent agreement between triplicates
 - Mean RSD = 6.2 %
 - # sets over 15% RSD = 24 of 297 (8.1% of sets)
 - Results over 15% RSD rerun to confirm analytical results
 - always confirmed – not an analytical issue, typically due to a deployment or handling issue
- AMoN Supply QC
 - <1% QC exceedance on over 450 QC samples from Jan –Sept 2019. Mean results for all blanks tested are typically less than or equal to 2018 values:

- Preparation Blanks:	0.019 mg/L (2018) vs. 0.012 mg/L (2019)
- Core Blanks:	0.013 vs. 0.009
- 2-Week Hood Blanks:	0.263 vs. 0.045
- Room Blanks:	0.524 vs. 0.451
- Hood Extraction Blanks:	0.047 vs. 0.018
- Water Blanks:	0.002 vs. 0.002
- Jar Blanks:	0.002 vs. 0.003

- AMoN Core and Preparation Blanks
 - Core blanks are tested as sampler cores new in the bag - a measure of NH_4^+ in the lot
 - All cores are tracked per batch and linked back to the preparation blanks
 - If serious contamination is observed, CAL can track and take corrective action
 - Preparation blanks (PB) are tested on a fully-prepared sampler.
 - PBs are basically travel blanks that have not been sent out
 - They have been put in jar, bag, freezer, etc. A measure of the cleanliness of entire process
 - No exceedances (> 0.044 mg/L) recorded for preparation blanks, and only a few for core blanks
 - Data suggests that newer lots show lower blank levels
- Transition from Triplicates to Duplicates
 - Fast growing network - drives the need to streamline prep and analytical workload
 - 297 triplicate sets at rotating sites in 10 months
 - Goal was 12.5% currently closer to 15%
 - 180 samplers prepped per deployment 30 for triplicates
 - Move to duplicates @ 15% = 14 less samplers/deployment
 - Allows room for ~10 more sites + QC without increased workload, equipment, or staff time
 - If more than ~10 sites are added, equipment & staff will need to increase
 - Precision has been demonstrated
 - Low RSD (average = 6%) for 10 months of triplicates
 - Duplicate data will serve the same purpose while reducing the number of samplers needed for QC
 - Earlier QAAG Motion: To approve the CAL's proposal to move to duplicate samples at 15% of the sites by January 2020.
 - QAAG will be assessing the data quality objective of duplicates – what % of sites with duplicates is needed long term to validate precision in the network?
- Impermeable Bag Study
 - At the beginning of the program, CAL experienced sampler breakage issues –the problem was traced to bad sampler lots (subsequently returned, costs refunded) and rigorous cleaning procedures (adjusted). Breakage problem much reduced, but jars are still heavy to ship
 - Testing anti-static impermeable bag for shipping (instead of glass jars)
 - Goal: Reduce sampler breakage and maintain or reduce blank levels of NH_4 and save on shipping costs
 - Pilot Study – Thanks to the participating sites for efforts and feedback!
 - 12 Sites: AR03, FL19, GA41, NH02, NS01, OH27, PA96, PR20, TX43, UT97, VT99, WY06
 - 7 paired deployments of samplers and travel blanks (one sampler in glass jar, one in impermeable bag, returned to CAL in same fashion) – focused on 3 summer deployments
 - October 2018, January 2019, Feb 2019, June – August 2019
 - Overall positive feedback from operators, but some comments that bags can be difficult to deploy in cold weather, and can blow away (need to send extra bags)
 - QAAG moved to approve use of anti-static bags as an alternative method for shipping AMoN passive samplers.
 - Continue use of glass jars for now
 - As the network grows, we may choose to switch to bags to reduce costs
- A plot of the difference in $[\text{NH}_4^+]$ between samplers deployed in jars and those deployed in bags shows no systematic bias in either system
 - Maximum differences between deployed samplers of $\sim \pm 0.1$ mg/L NH_4^+ , but typically ± 0.05 - 0.06 mg/L across the 12 sites in the Pilot Study
 - Maximum differences in travel blanks were $\sim \pm 0.03$ mg/L, and typically ± 0.02 mg/L or less. TBs stored in jars were typically higher in NH_4^+ than those in bags

- Further examination of co-located Travel Blanks again suggests blanks shipped in jars are slightly higher, on average, than those in bags, but the mean blank levels from the pilot study (0.046 mg/L) were substantially lower than the acceptance criterion of < 0.2 mg/L.

4. USGS External QA report – Greg Wetherbee (USGS)

- Planned activities for 5 Programs 2020 (from draft work plan)
 - Co-located Sampler Program – has not been operational for a while due to instrumentation needed for research activity.
 - Program will not be implemented in 2020. Planned research activities at future co-located sites are open for discussion.
 - NTN Interlaboratory Comparison Program. No change to NTN program in 2020 (11 labs); all the major precipitation monitoring networks in the Northern Hemisphere are represented.
 - MDN Interlaboratory Comparison Program
 - 4 labs added to the program for 2020: two in Korea, one in Thailand, and Minimata lab in Japan (NIMD)
 - Guey-Rong Sheu’s lab at Taiwan Central University has been instrumental in coordinating the program in Southeast Asia
 - Field Audit Program to assess contamination in NTN samples.
 - 100 participating sites receive test samples
 - MDN System Blank Program addresses contamination in MDN samples.
 - Program is continuing
 - Each site in MDN receives a sample.
 - These have typically shipped quarterly but will ship in April and September 2020 only, to ease the burden on the HAL.
 - Usually the samples are processed and returned soon after they have been sent out, but as time goes on the operators can forget about them.
 - The sample expiration dates on the System Blanks have served as a reminder to the operators to process the sample quickly, but this has largely not worked well.
- NUANC is winding down
 - CO11 and CO87 will close January 1, 2020
 - USGS will establish a new site on east side of Fort Collins, CO
 - Program will shift from Denver-Boulder north to Fort Collins
 - Existing site sponsors want to continue operations at CO06, CO85, and CO86.
 - Discussions underway to perhaps replace CO87 with a site in Berthoud or Loveland (later in winter or Spring 2020)
- 2017-2018 Report is in review and should be published by the end of January 2020
- Website has not yet been reconstructed, but Greg will make this a priority to make it happen in 2020
- Greg is planning to write a series of papers using data from the urban network
 - Estimating the fraction of N load in the South Platte River due to deposition, with John Novick (City & County of Denver)
 - Nitrogen isotopes in atmospheric NH₃ and NO₃⁻ and wet dep to assess source attribution (with Emily Elliot and Dave Felix)

5. Site Liaison Update - Richard Tanabe (NADP Program Office)

- Breaking news – KY99 NTN site will close permanently on December 17, 2019 due to loss of funding
- Calls to Tech Support line (800) 952-7353
 - In last three months (August, September, October 2019) saw a 22% decrease in calls compared to same period in 2018
 - 42% of 2019 calls involve Action Items (sensor, motorbox, supplies, etc.)
 - Now all the MDN calls spin through the 800 number (this was not the case in 2018), so the total decrease is encouraging
- Trouble Tickets
 - As of November 1, 2019, 18 Trouble Tickets were in “Open” or “In Process” status

- AZ99: missing bucket – blown out of collector?
- NC45: motor box issues, later damage to e-gage (bear?)
- NF19: Hurricane Dorian damage
- MA01: Strong winds blew over collectors – Nor’easter
- FL11: Frogs in e-gage (entered near optical sensors and into load cell)
- Trouble Ticket Breakdown
 - Site Power: 2
 - Raingage Data: 6
 - Collection Efficiency: 2
 - Equipment/Wiring: 4
 - E-gage: 3
 - Datalogger: 1
- Data Download
 - Continuing with data download modernization
 - 82 Androids issued so far
 - Power to the gage is a factor. When operating from the 12 VDC datalogger feed, sometimes insufficient power for Bluetooth operation depending on the power source. External power is an option for ETI installations
 - 2020 Calendar page to advertise data download modernization efforts, technology
 - Wi-fi/Cell/satellite telemetry is still moving forward
- Site Support Communications
 - Increased communication with operators via listserv
 - Balance between not enough info and spam
 - Operational bulletins
 - Surveys conducted to gather Contact info, MDN transition
 - Electronic replies: 191 responses
 - Paper replies: 86 responses
- Network Equipment Depot (NED)
 - Colin Kelly started in August 2019
 - Priority to stock and ship ACM sensors and motorboxes
 - Equipment Shipped Out
 - Dominated by need to replace ACM Sensors (18 shipped) and motorboxes (23 shipped)
 - NCON Sensors: 9 shipped out
 - NCON Motorboxes: 3 shipped
 - Need alternative collector to ACM
 - 12V Batteries: 16 shipped
- ETI Repair Loaner Program
 - Implemented an ETI Repair Loaner program for sites which are experiencing load cell issues, and optical sensor failures.
 - Purchased 3 ETI NOAH IV’s and 5 outer shells
 - NC06 Beaufort failed – NED shipped out replacement Apr/2019 - Installed May/2019
 - Installed May/2019
 - Wood facilitated repairs to the site ETI
 - Received loaner back at NED Oct2019
 - What is Program Office’s Responsibility?
 - Recent ETI (NJ99) did not pass EEMS calibration test
 - It is a load cell issue
 - Who pays for repairs? Operating agency, funding agency, NADP? We have kicked this down the road for a while

Discussion:

Greg Wetherbee stated that if his sites had costly equipment issues, USGS would expect to pay for repairs, and hopes that other sponsors would too. But using the NED to swap out faulty equipment quickly, while allowing for subsequent (sponsor) repairs, will ensure that data collection continues. Richard agreed.

- Improving Sites
 - Working with EEMS
 - Setup a standing purchase order
 - Improve site infrastructure or data quality – e.g., need to replace Belforts, ideally paid by sponsor or operating agency
 - EEMS can lend a hand when in the vicinity of a site needing improvements?

Discussion:

Cari Furiness inquired whether the PO can put together a list of supplies, consumables, and commonly used spare parts for the collectors and gages to inform site sponsors of anticipated costs? Richard stated that this was a good idea, and a good way forward (like AMNet does) – will work on this and present in Spring 2020

- In Search of Another Collector...
 - Motion at Spring Meeting to authorize the Program Office to purchase an ECCC modified D400 model collector for testing.
 - ~\$9.5K was approved for development of a prototype
 - Scaled back the required specifications based on feedback from CAPMoN
 - This dropped the cost \$4.5K for prototype
 - Delivery expected January 2020

Discussion:

Greg Wetherbee asked if the prototype would be tested with a grid sensor or Thies precipitation sensor? Richard responded that a Thies precipitation sensor would be used – will approve the collector and then pursue an alternate sensor, as appropriate.

Bob Larson inquired if the PO has received the bad gage from NC06? If so should test and recalibrate? Richard replied that NC06 facilitated repairs

6. Bag Sampling Issue – Chris Worley (WSLH, CAL Manager)

- Initial bag sampler assessment looked for a positive bias in the bag samples due to contamination - bag sample blanks were comparable to buckets BUT
 - Camille occasionally uses FMDL solution (2-3X analytical MDLS) – 200 mls poured into bags and then processed – filtered into analytical bottles and analyzed
 - Katie noticed NO_3^- loss – called for a further assessment
 - A preliminary study confirmed NO_3^- and NH_4^+ loss in bags
 - Triggered an in-depth study and a larger assessment using three different solutions of varying concentrations to see if the loss is concentration-dependent
 - Also tested differing treatments and procedures - tested loss on bags in buckets, buckets only, and cut-up sections of bags placed in the analytical bottles
 - 1, 3, 7-day exposures
- Results
 - No effect of analyte concentration on losses of cations (Ca^{2+} , K^+ , Mg^{2+} , Na^+), Cl^- , or SO_4^{2-}

- N species and Phosphorous – a little loss is associated simply with transferring the FMDL solutions directly into analytical bottles – especially NH_4^+ and P (greater loss than NO_3^- in all scenarios)
- Pouring FMDL solution into bottles with 10” by 10” bag sections showed extreme losses of all species NO_3^- , NH_4^+ , and P at target concentrations of 0.03-0.06 mg/L
- The cut-up bag sections characterized by lots of surface area and adsorptive sites
- There is also an issue with losses of N and P in buckets
- Somewhat greater losses with longer exposure times in all treatments
- Losses are generally greater for NH_4^+ and P than for NO_3^- in most tested treatments.
- Losses of NH_4^+ and P are greater at lower concentrations and can be up to 1/2 to 2/3
- Next Steps
 - Set up co-located samplers at the Arboretum (WI06)
 - Collectors connected to one sensor to ensure identical opening and closing times.
 - Deploy bucket vs. bag in bucket.
 - WSLH is preparing startup kit (dustbuster modifications, bucket holes drilled, buckets weighed, etc.)
 - 2 months to complete
 - Compare nutrient losses in bags to buckets
 - Is follow-up with NOS necessary? If losses are comparable, can WSLH proceed? More evaluations needed?
 - There is a bias between bags and bucket due to loss, but these losses seem fairly consistent.
 - If WSLH proceeds with bag rollout, will start regionally and start sites in the south and work north (opposite of our original plan), starting in the South in March due to colder weather
 - Aim for 50 sites, every 2 weeks, completion in 2.5 months.
 - Looking for input -additional, larger studies? Repeat the above study?

Discussion:

Tom Butler said that ICAL (University of Illinois Champaign-Urbana) conducted a bag and bucket study for AIRMoN in ~ 2012. It might be good to revisit their findings?

Camille Danielson replied that her understanding was that the ICAL study was conducted with actual precipitation solutions, not spiked solutions, and looked at bucket losses, not a bag vs bucket comparison.

Chris Worley clarified that the bag material used in the WSLH study was the same as that used in AIRMoN, but of different design (no longer gusseted). Exposure time in the bag is an issue, and NO_3^- losses are less than NH_4^+ and Phosphorous losses. The ICAL results pointed to the need to refrigerate samples to reduce losses.

John Walker asked about initial studies pointing to NO_3^- losses. Chris W. confirmed that these losses triggered a red flag that prompted an additional study, but primary losses are NH_4^+ and PO_3 .

Camille stated that initial studies showed little/no losses in buckets with 1-day exposures, but losses in buckets may approach bag losses at several day exposures (5-6 days). Microbial processes responsible?

Tom Butler ventured that there are not large differences in analyte retrieval in buckets vs bags – correct? Chris W. confirmed this and noted that losses are observed simply when pouring the FMDL target solutions directly into the analytical bottles, and that there is not a huge difference between bucket and bag losses.

Martin Shafer commented that refrigeration is necessary to retain target solutions at original levels. Microbial effects?

A question was asked – at what point does this problem require the setting of new data quality objectives? How to account for potential losses statistically? Martin agreed that DQ objectives are necessary to define acceptable results, but more work would need to be done to refine these DQOs.

Chris Rogers expressed alarm over the timing of the bag rollout at 50 sites in March, stating that Wood is not ready to do that so quickly. Chris Worley agreed and reiterated that the WSLH is taking a cautious approach to the timeline. The WSLH may delay the bag deployments depending on data evaluation and additional testing, and want to do the tests with co-located ambient precipitation samples

John Walker pointed out that temperature factors may complicate the interpretation of field data and that lots of data may be required to tease out confounding factors of field collection – for example, to account for the range of temperatures and other conditions encountered at sites.

In response to a question, Chris Worley commented that all materials used in the collection and analysis of major ions are new and one-time use (e.g., bags and analytical bottles).

Bag manufacturer is Degage (TX) – their products are used in clean rooms. Their polyethylene bags were also used by ICAL.

Shortening the hold times of the bags may lessen nutrient loss

Kulbir Banwait, ECCC, stated that CAPMoN bags are mylar coated and tested in small lots to confirm acceptable performance. If performance is acceptable then the go-ahead is given to manufacture more. Extensive and ongoing testing is conducted at ECCC, and it may be that the WSLH results may change due to lot variability (better or worse performance) – suggests the need to do a long-term study at WSLH.

Mark Olson suggested that 1-day collection should be the target.

Martin Shafer asked – is there a hypothesis as to why characteristics of CAPMoN bags change with hold times (storage times before deployment)? The answer was negative.

Cari Furiness asked if there is also a problem with losses in buckets and do bags represent an additional problem? Answer - There is a bias in bucket results vs bags, but these biases are generally consistent. Camille Danielson said that the contamination levels of bags is better than those of buckets. Martin Shafer responded that the losses are confounding the benefits of bags, and losses occur even in one day.

Tom Butler said that organic N loss is a problem in precipitation samples and suggested that microbial processes may also be affecting NO_3^- , NH_4^+ , and P loss.

A general consensus emerged that further work is needed to quantify nutrient losses before the bag rollout.

John Walker pointed out that various processes (e.g., diffusive loss, microbial activity) may be at play and confounding the overall results.

A consensus emerged for WSLH to continue with the planned study and report out after more data have been collected, at the Spring 2020 meeting.

Tom Butler that his site and 9 other sites are using bags now – is there a need to discontinue bag samplers at these sites (NUANC, AIRMoN/NTN conversion sites)?

Motion: To delay the rollout of NTN bag sampling to allow the CAL to further investigate potential losses of analytes (primarily ammonium and phosphorous) in NTN sample collection bags and to report back at the Spring 2020 meeting.

Moved by Camille Danielson, seconded by Eric Prestbo. Motion approved

WCAL will collaborate with ECCC to order bags from the same manufacturer that supplies CAPMoN bags, to include in ongoing WCAL tests and to compare to NTN bags

7. Wet Incomplete/Wet Dilute Discussion – Camille Danielson (WSLH, CAL QA Manager)

- Current Definitions
 - Trace Samples: < 1 ml not analyzed
 - Wet Incomplete (WI): 1- 12 mls, unfiltered, no pH or conductivity, may be diluted at bench because of high analyte concentrations
 - Wet Dilute (WD): 12-30 mls, pH & conductivity analysis, filtered with large NTN filters, diluted to 25 mls upon receipt for full analysis
 - Wet > 30 mls, pH & conductivity analysis, filtered, full analysis, sample archived if sufficient volume
- WI Concerns
 - WI samples are stored in 1L bottles and analyzed unfiltered.
 - Inconsistent treatment of NTN samples
 - Some are filtered/Some not
 - WI are usually contaminated/have higher analyte concentrations
 - pollen and debris often present
 - Most need dilution at the bench for 1 or more analytes
 - Increased potential for analyte concentration changes over time without filtration
 - Possible negative impact on instrumentation
 - Incomplete analysis! ~ Half of samples do not get cation analysis, some samples are analyzed only for NH_4^+ .
- New WI/WD Definitions Approved by the QAAG
 - Trace Samples: < 4 mls, no analysis
 - Wet Incomplete (WI): 4-13 mls, no pH or conductivity analysis, filtered with Acrodisc syringe, diluted upon receipt to 15 mls, all other analyses performed
 - Wet Dilute (WD): 14-27 mls, pH & conductivity analysis (8 mls), filtered with Acrodisc syringe diluted to 15 mls upon receipt (if needed), full analysis
 - Wet \geq 28 mls, pH & conductivity analysis, filtered with Pall (large) PES filters (same material as in Acrodisc filters) full analysis, archive of sample with sufficient volume
- WI / WD Sample Stats
 - From 1/2/19 – 10/21/19: 10,465 samples have been logged in
 - Of the samples logged in, 8913 were analyzed (W, WD, WI) ~85%
 - Of the samples analyzed, 213 were WIs (~2.3%)
 - 91 of the WI samples required dilutions at the bench (~43% of WIs)
 - 112 were WD (wet dilute 13-27 mls) - ~1.2%
 - New protocol will apply to ~ 3.5% samples
- Study Design to Assess Effects of New Definitions
 - 12 NTN samples of varying concentrations were studied
 - 10 treatments for the samples
 - Unfiltered
 - Filtered with large standard filter
 - Filtered with Acrodisc syringe filter
 - Multiple dilution protocols
 - 38 MQ blanks were used for testing the syringes, filter types and source water for contamination
 - Compared NTN results for all analytes
- Results: Filter Blanks
 - All blanks were less than NTN MDLs for all analytes
 - Large PALL NTN filter blanks had higher concentrations than Acrodisc filter blanks for Ca^{2+} , Cl^- , and SO_4^{2-} , otherwise similar
 - No significant contamination from either filter type
- Results presented for NTN Sample - TU4993

- Comparable results for all analytes regardless of sample treatment (unfiltered, large filter undiluted, large filter diluted, Acrodisc undiluted, Acrodisc diluted)
- Results Overview
 - Method blanks were all below MDLs
 - NTN sample results comparing all treatments: majority of RSD <6%
 - Largest analytical difference between large and syringe filter for all samples was 0.1 mg/L
 - 83% of unfiltered samples were significantly higher in ammonium compared to their filtered counterpart
 - This protocol will provide consistent results for all analytes (except pH/Cond on <13 ml samples) for all samples over 3 mls
 - Poster by Katie Blaydes presents all the data
- Recap of QAAG Motion
 - Wet Incomplete (WI) would be assigned to samples with 4 to 13 mls, filtered with the Acrodisc syringe filter, diluted to 15 mls (by weight), which should allow for complete analysis with the exception of pH and specific conductance.
 - Wet Dilute (WD) would be assigned to samples with 14 to 27 mls. An 8 ml sub-sample is removed for pH and conductance. The remaining volume would be filtered with an Acrodisc.
 - Trace (T) samples will be defined as < 4 mls and will not be analyzed.
 - Wet (W) samples will be defined as sample volumes > 27 mls
 - Implementation of this protocol will begin January 1, 2020.

Discussion:

Cari Furiness asked about the number of samples that would be potentially affected by the change in T/WI/WD definition? Camille responded that the new protocol will apply to ~ 3.5% samples (~ 2.3% WI, ~ 1.2% WD).

8. USGS NGWOS NY68 Update – Mike McHale (USGS)

- Expanding the Boundaries of NADP
 - Next Generation Water Observing System (NGWOS) – a USGS Program
 - Proposal to add hydrologic measurement instrumentation to select NADP sites advocated by Mike McHale, Greg Wetherbee, and Doug Burns
 - When fully implemented, the USGS NGWOS will provide real-time field and remote sensing data on:
 - Streamflow
 - Water-cycle components (ET, snowpack, soil moisture)
 - Broad suite of water-quality constituents
 - Connections between groundwater and surface water
 - Stream velocity distribution
 - Sediment transport and
 - Water use
- Delaware River Basin: NGWOS pilot watershed
 - A good site to marry atmospheric and water cycle measurements
 - At Biscuit Brook (NY68), adding:
 - Satellite Transmission
 - Snow Water Equivalence
 - Soil Moisture
 - Soil Temperature
 - Air temperature
 - Relative Humidity
 - At Nearby Mesonet Claryville (a NY State Mesonet Site), proposing to add:

- Evapotranspiration tower
 - o Instrument acquisition and deployment and landowner permissions take time to rollout the pilot.
- Proposed expansion of the NADP-NGWOS Collaboration
 - o 2 additional stations in the Delaware River Basin - Milford PA72, Washington Crossing NJ99
 - o Plan is to expand NADP involvement nationally as NGWOS expands into other basins.

Discussion:

Doug Burns mentioned the need to install satellite transmission capability wherever pilot sites are installed. USGS will assume responsibility for this and will interface with NADP measurements. Doug also added that this pilot study will enhance the value of NADP to USGS and other agencies, which is critical in an era of shrinking funding, and is an underlying strategy for the pilot. The addition of water cycle measurements at select NADP sites will benefit both atmospheric and terrestrial aquatic modeling efforts.

David Schmeltz asked where the data would reside and will the datasets link to NADP? Mike McHale responded that the data currently would reside in the corporate USGS National Water Information System (NWIS) database. The ET data will flow to the NY Mesonet, and there are data access issues to be resolved there.

Cari Furiness asked whether additional duties will be required of NADP site operators to support the pilot? Mike responded no, that the USGS will assume operational duties and responsibilities for NGWOS instrumentation. There is no sample collection involved. Doug Burns stated that USGS has reached out to the expansion sites in the DRB, and that their only concern was to fit instrumentation into the existing site footprints. Mike added that ET measurements will be added only to the NY68 site for now.

9. NOS Secretary: Nominations & Election – Melissa Puchalski (USEPA)

Motion: To nominate Ryan McCammon (BLM) as incoming NOS Secretary.

Moved by Melissa Puchalski, seconded by Richard Tanabe. Motion approved

10. Other Business – Richard Tanabe

- External review process for HAL, CAL, and PO
 - o HAL review was last done at EFGS in 2015
 - o PO review was last done in 2016 at ISWS
 - o CAL review was last done at ICAL in 2017
- With the transition of the PO and CAL to WSLH should condensed reviews of CAL and PO be conducted?
- What is the plan going forward, with all three entities at WSLH?
 - o Three separate reviews?
 - o Combine reviews?
 - o QAGG suggestion to tie the PO review to the Friday of the Spring Meetings since the NADP community is resident in Madison at that time
 - o Internal discussions proposed that each entity under review send PowerPoints or conduct a Webinar with reviewers to present introductory overviews in advance and improve efficiency of the review process. Reviewers could hit the ground running
 - o It would be too burdensome to do all reviews in the same week
 - o Direction?

Discussion:

Greg Wetherbee stated that reviewers have typically been from federal agencies and ECCC because they have travel funds. In the past the PO has sometimes paid reviewer travel costs. The federal pool of

reviewers is limited, and because reviewers are not paid for their time, federal agencies are still the most likely to serve.

Richard agreed and said that typical review teams in the past have a team leader, a data management expert, a chemist/analyst, QA expert, and site support specialists, and that some reviewers have worn multiple hats during the process.

Mike McHale asked whether it is reasonable to try to do all the reviews at once? Richard replied that different skill sets are required for each review, especially for the HAL making that difficult. May call for expanded review teams?

Greg Wetherbee stated that in the past, a review team would include one member who sat on the previous review team to assess the extent to which labs/PO changed protocols and policy to incorporate findings from the previous review, and to provide a measure of continuity, but that may not be feasible given the limited pool of potential reviewers.

Kristi Morris volunteered Barkley Sive from NPS to serve as a lab reviewer. Doug Burns suggested reviewers from the USGS Middleton lab, and Martin Shafer mentioned possible reviewers from the Sea Grant Office in Madison

Next Steps – can the HAL and CAL reviews be done next summer (2020) with one team (expanded to accommodate the HAL?), and the PO review done later?

Greg Wetherbee suggested that Budget Committee members might be enlisted to assist the PO review

Consensus was reached that a 3-year review cycle was reasonable. Four years is too long, and a 2-year cycle is too burdensome.

Mike McHale commented that the HAL and CAL reviews are more critical than the PO review, and that the HAL review should be the number one priority

Consensus was reached that lab reviews take priority for now, and the HAL is the highest priority

Richard will work with Camille Danielson and Greg Wetherbee to identify reviewers

Motion to adjourn.

Moved by Richard Tanabe, seconded by Camille Danielson. Motion approved