Final Joint Meeting Minutes – 2024 Spring NADP Meeting, Madison, WI

Document dated August 6, 2024

Three Motions were passed in Joint:

1. Approval of Joint Minutes from Fall 2023 meeting.
Moved by David Gay moved, second by Tim Sharac
Motion approved

2. Motion: Change the NTN Bag Sampling Preparation and Bag Sample Change-out SOPs to weigh the bucket with the lid on it with the change to begin on January 1, 2025 after all site operators are informed of the change. This will also require a change to the Field Observer Report Form so the observer can indicate that the lid was included in the bucket weight. Changes to the SOPs and the FORF will be made by the Fall 2024 meeting.
Moved by Mike McHale, second by Eric Hebert
Motion approved, one opposed (on line)
NOTE: THIS MOTION WAS TABLED IN EXEC TO ALLOW FOR FURTHER STUDY

3. Motion to Adjourn
Moved by Mike McHale, second by Winston Luke
Motion approved

Joint Agenda (Session I)
Tuesday April 30, 2024: 08:30-12:00 CDT
Agenda

8:30 AM	Welcome, Logistics, Introductions, Approval of 2023 Fall Joint Minutes (Mike McHale)
8:40 AM	Welcome address by Dr. James Schauer, WSLH Director, NADP Principal Investigator
8:50 AM	State of the NADP (David Gay, NADP Coordinator)
9:20 AM	Executive Committee on the status of our 2024 priorities (Mike Bell)
9:30 AM	CASTNET Update (Melissa Puchalski)
9:35 AM	USGS NADP Budget Cuts (Ryan McCammon)
9:45 AM	Website improvements/Daily precipitation volume data availability (Richard Tanabe)
10:00 AM	Break
10:20 AM	PFAS 12 Point Plan Update (Martin Shafer and Amy Mager)
10:40 AM	PFAS update (Melissa Puchalski and John Offenberg)
11:00 AM	PFAS Workshop/Discussion (Melissa Puchalski and John Offenberg)
12:00 AM	Lunch

Joint Agenda (Session II)
Thursday May 2, 2024: 01:30-05:00 CDT
Agenda

1:30 PM	Welcome (Mike McHale)
1:40 PM	Subcommittee Highlights-Motions Only
	MELD (Colleen Flanagan-Pritz/Katherine Ko/David Schmeltz)

TDEP/CityDep (Amanda Cole/Colleen Baublitz/Kristin Foley)
CLAD (Nifer Wilkening, Jeremy Ash, and Kris Novak)
Ozone Working Group (Jeffrey Herrick/Kris Novak)
AMSC (Andy Johnson/Selma Isil)
NOS (Mike McHale)
EOS (Rebecca Dalton/Chris Rogers/Emmi Felker-Quinn)
DMAG (Mark Kuether/Zac Najacht)

2:40 PM TDEP Workshop Summary
3:00 PM Break
3:20 PM CAPMoN Update (Jason O'Brien)
3:35PM QAAG Update/ QA Report (Nichole Miller)
3:50 PM 2022 PO Review Findings and Response (Richard Tanabe)
4:00 PM Spring Meeting 2024 (Winston Luke)
4:05 PM 2024 Fall Meeting and Scientific Symposium (Melissa Puchalski)
4:10 PM Wrap-up (Mike McHale)

Welcome, Logistics, Introductions, Approval of 2023 Fall Joint Minutes (Mike McHale)

- Mike opened the meeting and welcomed the attendees. No formal round of introductions in the interest of time.
  - First-time attendees
    - Dave O'Dell from WSLH, IT division
    - Nathaniel Boerner, research support analyst in WSLH
- Approval of Joint Minutes from Fall 2023 meeting.
  - David Gay moved, Tim Sharac Second
  - Motion approved

Welcome address by Dr. James Schauer, WSLH Director, NADP Principal Investigator

- Jamie welcomed attendees, in-person and virtual. He will be unable to attend the entire meeting, but stressed that there is a lot of good content that is very relevant to the direction and future of NADP.

State of the NADP (David Gay, NADP Coordinator)

- Network Counts – NTN, MDN, AMoN
- NTN
  - 251 sites
  - Many Canadian sites started
    - AB37 Calling Lake, 10/24/2023
    - AB41 Kananaskis, 3/26/2024
    - AB42 Fort Chipewyan, 3/26/2024
    - AB38 Cold Lake, 3/26/2024
    - AB40 Beaverlodge, 3/26/2024
    - AB42 Fort Chipewyan, 3/26/2024
  - SC03 Savannah River restarted 1/1/24
  - In discussion with Lakeland Industry and Community Association (LICA)
    - not-for-profit association
    - Would like to start 3 NTN sites in Cold Lake Region
  - LNG Canada:

        - A couple more sites in Northern BC
    - USGS Site Closings in next 6 months
        - TN14 (already shutdown) Hatchie National WR
        - 99NY plus one additional QA site
        - ME08 Gilead
        - VA00 Charlottesville
        - AR02 Warren
        - CA45 Hopland
        - CAN5 Frelighsburg
        - NY10 Chautauqua
        - AZ99 Oliver Knoll
        - KS32 Lake Scott State Park
    - FWS Site Closings in next 6 months]
        - FL05 Chassahowitzka National Wildlife Refuge
        - GA09 Okefenokee National Wildlife Refuge
        - MI48 Seney National Wildlife Refuge-Headquarters
        - SC05 Cape Romain National Wildlife Refuge
- AMoN
    - Currently: 89 active sites
        - Last Closed - KS97 Kickapoo Tribe – Powhattan, 8/21/2023
    - Possible New AMoN Sites
        - Nealson Watkins, EPA, xx sites for NCORE (urban), last August
        - Bo Call, State of Utah, needs measurements in Cash Valley (ammonia volcano), SLC roadsides, last August
        - Deborah Souder, Maryland (Fall Meeting), December
        - Andrew Knight, Sandia National Labs, southern CA, December, put a proposal together
        - Rodolfo and I talked about AMON sites along the US Mexico Border and in Mexico City
        - Sac and Fox of Mississippi in Iowa (Lee Searles), March
- MDN
    - 80 Sites
    - New
        - SC03 Savannah River Barnwell, SC 1/1/2024
        - OH02 Athens Super Site, Athens OH 4/26/2022
    - Closed (FWS Sites)
        - FL05 Chassahowitzka National Wildlife Refuge 3/26/2024
        - MI48 Seney National Wildlife Refuge-Head. 3/26/2024
        - ND01 Lostwood National Wildlife Refuge 3/26/2024
        - SC05 Cape Romain National Wildlife Refuge 3/26/2024
    - Potential Sites of Interest
        - MN05 Fond du Lac/EPA Region 5, should start this summer
        - WA03, Makah (C. Winke) would like a second site, might be in Olympic NP
        - NVxx Pyramid Lake Paiute Tribe/EPA Region 9, interested in an MDN site, and funds are available
- AMNet
    - 12 Sites
    - 2 Closing soon (NOAA)
        - AK95
        - HI00

- Request for equipment, Vietnam (Nguyễn Lý Sỹ Phú, Guey-Rong Sheu's student) - he has yet to be able to fund

- Mercury Litterfall Network (MLN)
  - 24 Sites
  - FWS Closures: effective April 1, 2024
    - GA09 Okefenokee National Wildlife Refuge
    - MI48 Seney National Wildlife Refuge-Headquarters
    - MO46 Mingo National Wildlife Refuge
    - SC05 Cape Romain National Wildlife Refuge
  - Interest
    - Bay Mills Community, upper peninsula MI (J. Waesolek)
    - WA03, C. Winke, has some interest here
- Financial Notes
  - Budgets are pretty balanced as of right now (+/- 2%)
    - Should be $20K in the black by the end of the fiscal year (June 30)
    - USGS and FWS closings will not help
    - Less money in 2025
    - Inflation led to ~ 20% increase in costs from 2020-2024
  - Next year it is going to be tougher
    - State of WI has raises coming (another 2%)
    - Salary costs, $1,651,106, or another 30K
    - And everything else will continue upwards
  - There is some good financial news
    - We finally have federal shipping rates
    - Don't have many specifics, but we do have better rates now for FedEx, and UPS should be putting the final touches on it this week. (very efficient)
  - Other…
    - A 2% increase (to funding agencies) coming on samples after July 1, 2024
- Other News
  - Data Review is behind
    - But, there is a plan in place to increase the speed of review from months to weeks
    - Comparing August and Sept with new system now
    - Need more review to convince ourselves that it is working
    - QAAG is aware
    - More in NOS
  - Doing more with same, or new things
    - Save money, with
      - Faster, more efficient data review
      - MDN Bag Sampling
      - Two-week MDN samples
      - AI reading of Field sheet
      - Using Alphas vs. Radiellos
      - Robotic sample filtration
    - Bring in more money by
      - Offer total N and P in NTN samples
      - Pollen observations
      - Passive sampling for Hg
      - Black carbon in precip
  - Planning a Test of SNIPiT

        - With the National Park Service
          - Morris, Schichtel, CSU/Collett
        - Objective
          - Evaluate SNiPiT wet deposition sampler to routinely measure total N and P.
          - Assess measurement uncertainty and biases
          - Optimize sampling protocols for use in remote environments
        - Location(s)
          - CSU Christman field
          - Duke Forest?
    - Bag Sampling for the MDN
        - Still moving forward, but slowly
        - Back to a Teflon bag
          - It seems that a PETG bag really isn't possible
        - Manufacturer Flurolab
          - Purchased basic bags for fundamental QA review; test for Hg blank levels in bags
          - Verify utility of overall design, make subtle changes as necessary, then order in bulk
          - Basic 12x13 bag is $10 each
          - But will still save money
    - Passive Hg effort
        - Christa has some interesting data coming (QA data) – in MELD tomorrow
        - A 12-point plan in the works
        - Analysis seems to be working well, and we can do this
    - New PFAS Network?
        - A 12 point plan is in the works
        - NADP paperwork is moving forward within the NADP Structure to measure PFAS in precipitation in a network mode.
        - In the pilot stage, running through this entire year
        - Several sites in the network
        - Update on status in NOS
    - Planned 2024 Program Office and Lab Combined Audit
        - Planned for summer
    - David Gay's Travel
        - National Ambient Air Monitoring Conference, August 2024, New Orleans
        - National Air Program Meeting – Forest Service, Duluth, May 2024
        - International Conference on Mercury as a Global Pollutant (ICMGP), July 2024, South Africa, booth and small-dollar supporter
    - East Palestine Train Accident Manuscript
        - Submitted to Environmental Research Letters
        - 2nd version (post review and update) went in last week.
        - Yesterday ERL asked for a copy to post online
        - The impact was felt over 14-15 states
        - Very high chloride values, very high pH, not low pH as we expected
        - High cations from North Carolina to Maine to Wisconsin.
    - Fall Meeting, 2024
        - November 4-8, 2024, Duluth MN
        - The Inn on Lake Superior
        - Federal rates available, all rooms
        - Melissa will have more info

2024 NADP Executive Team Priorities (Mike Bell)

- The EC is responsible for executing decisions and actions brought forward by the subcommittees, advisory committees, science committees, and ad hoc groups; for making budgetary decisions; and for ensuring program continuity, stability, and balance.
- Voting Members
    - NADP Past-Chair – Linda Geiser
    - NADP Chair – Mike Bell
    - NADP vice-Chair – Melissa Puchalski
    - NADP Secretary – Catherine Collins
    - Budget Chair – Ryan McCammon
    - NOS Chair – Mike McHale
    - EOS Chair – Beck Dalton/Chris Rogers
    - SAES Rep – Doug Buhler
- How we currently function
    - Two open meetings with all members and committee representatives
        - Spring/Fall Meetings
    - Monthly core planning and logistics meetings with NOS Chair, PO and NAL representatives
        - Committee representatives invited based on topic/need
- 2023 Priorities
    - Develop guidance for operational and funding issues.
    - Prepare a 12-point plan for a PFAS Network
    - Develop a total N and total P monitoring program (SNIPiT)
    - Expand monitoring to support Environmental Justice and urban information needs.
- Priorities for 2024
    - Helping agencies manage sites among decreasing budgets
        - Many federal agencies are experiencing budget cuts that are requiring some monitoring sites to be mothballed.
        - Trying to help where we can so that we understand how agencies are ranking sites and if we can support science committees in developing data products to assist.
        - Supporting PO in having conversations with appropriate staff/representatives in Washington DC.
    - Working with lab to increase agency awareness of sites not meeting data completeness criteria
        - Due to multiple sites in the northern-Midwest not meeting data completeness criteria, there was a gap in the 2022 Wet Deposition maps.
        - Trying to identify responsive components that can be communicated quickly to agencies/operators.
        - Example from IMPROVE network – summary dashboard quickly shows operating status of stations
    - Providing feedback on development of PFAS network
        - Approved as a transitional network in Fall Meeting 2023
        - Currently collecting samples from ~40 sites.
        - Review makes sure that SOPs are in place, workload does not affect data processing of other networks, and the data review and distribution exists.
    - Developing leadership cheat sheets to help science committees transition to new leaders
        - Brief summary of Robert's Rules of Order
          - How to make/pass a motion
          - What actions need motions
        - Summary lists of current committee leadership

CASTNET Update (Melissa Puchalski)

- CASTNET SAB Review Timeline
  - EPA's Science Advisory Board (SAB) accepted the Program's request to convene a panel of experts that would advise the Agency on how to transform the network, achieve cost-savings, and ensure it continues to provide value to the Agency and scientific community
  - Fall 2022: SAB accepted request to review program
  - February, 2023: CASTNET SAB Panel was formed, EPA prepared background material and charge questions
  - May 2023: Panel convened an in-person meeting; public comments also provided
  - August 2023: Draft CASTNET Report posted to the SAB website
  - October 2023: Virtual meeting held to address inconsistencies and prepare final draft recommendations and letter to the Administrator
  - February 2024: Draft Final Report submitted to the Chartered SAB for review and concurrence; Briefed OAP on proposed next steps
  - April 2024: Chartered SAB to submit report with recommendations to the Administrator
  - Beginning Spring 2024 -Agency response to SAB; communicate and continue to implement changes using input from SAB report and stakeholders to address funding levels
- Key SAB Recommendations
  - CASTNET and NADP Programs were viewed favorably by the review panel
  - Maintain as many long-term multipollutant (gases and particles) measurements as possible.
  - Emphasis on the value of long-term consistent measurements over adding new pollutants
    - Prioritize sites using metrics that align with Agency's monitoring objectives
    - Replace ozone analyzers
    - Upgrade site infrastructure
    - Continue to archive samples and provide CASTNET locations for advancing air quality research
    - Report SO2 concentrations in units of ppb for comparison to the National Ambient Air Quality Standards (NAAQS)
    - Continue to provide bibliography (14 articles in 2024)
  - Evaluate changes to frequency of filter pack measurements (e.g., consider bi-weekly)
    - Consider hourly measurements and lower-cost methods as instruments/sensors become available to replace the weekly measurements
  - Add PM2.5 sensors to create a more robust multipollutant monitoring network for health and climate assessments
  - Address spatial gaps in the Nation's air quality monitoring network in the Central US, with emphasis on nitrogen measurements
  - Expand CASTNET tribal monitoring sites to better understand health and environmental impacts to tribal communities
  - The SAB panel also noted they understand the limitations of shifting budgets and priorities and offered metrics to assist the Agency in strategizing possible adaptive approaches. The metrics are designed to help determine synergies across network objectives and weigh potential impacts of possible alterations to the network.
- Program Changes and Updates
  - Most sites that were suspended in May 2022 remain suspended
    - Woodstock/Hubbard Brook (WST109, NH) – ozone restarted in October 2023; filter pack restarted January 2024; AMoN remains suspended
  - NPS discontinued sampling at Petrified Forest National Park (PET427) in December 2023

- Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas (KIC003/KS97) discontinued sampling in July 2023
- EPA will discontinue NO/NOy monitoring at all sites except Bondville (NCORE)
- Discussions with Haskell Indian Nations University (Lawrence, KS) to establish a field monitoring station
- PhenoCam live views added to CASTNET site pages
- New TDEP maps were published (v.2023.01)
- New CASTNET site to be installed at Cape Canaveral, FL in collaboration with Indian River Lagoon Council and the National Estuary Program – summer 2024
  - Second site to be installed in South Florida Q3 of 2024
- Testing new ozone analyzers and PM2.5 sensors for potential deployment at CASTNET sites

● Research Studies
- Wet Soluble Organic Nitrogen (WSON) study at 25 CASTNET locations (ORD, WSP)
  - Preliminary results indicate organic nitrogen (water soluble particles) can contribute up to 50% of the nitrogen budget when site is impacted by biomass burning
- Midwest Ozone Study (EPA/ORD) – Spring 2024 (ORD, WSP)
  - Santee Sioux (SAN189/NE98) – site will be relocated to tribal offices, NO/NOy analyzer will be installed
  - Stockton (STK138/IL37) – enhanced NOy system will be installed
- Wildfire impacts in Western US (EPA/ORD, EPA/R8, CSU, NADP, WSP)
  - Analyzing black carbon in precipitation, levoglucosan measured in subset of samples
  - Statistical analysis to evaluate changes in potential wildfire tracers over time
- Prescribed fire impacts on air quality (GA Tech, WSP)
  - PM (sensor evaluation) and black carbon measurements (CASTNET Teflon filter) at GAS153 during burn season
- Perchlorate impacts from fireworks on drinking water sources (Texas Tech, WSP)
  - Sample extracts for 4 weeks in the summer (2022, 2023) from 53 CASTNET sites

USGS NADP NTN Budget Cuts (Ryan McCammon)

● USGS-NADP Budget Cuts
- The USGS Water Resources Mission Area took a $15.66 M cut from the FY23 enacted budget.
- USGS-NADP is one of several networks to experience a budget reduction.
- Total reduction was 15% including the cutting of 10 NTN sites
- Sites to be closed and the rationale (an average site costs ~$4-6k annually):
  - VA00: $17,509 University of Virginia; most expensive site
  - NY10: $13,715 SUNY at Fredonia; second most expensive site
  - KS32: $10,660 State of Kansas Department of Wildlife
  - AR02: $9,638 University of Arkansas
  - CA45: $8,930 University of California
  - 99NY (co-located site with NY99) plus one (planned) additional QA site
  - ME08: Site flooded in 2023
  - TN14
    - The manager of US Fish & Wildlife Refuge did not want to continue operating the site
    - A 3-month exhaustive search for a new site operator failed to yield positive results.
  - AZ99: Solar site with constant issues
- USGS prepaid the analytical costs through end of August
- FY25 Funding levels expected to be at or below FY24
- The USGS-NADP network is the least funded out of all the monitoring network
- The possibility that the entire USGS-NADP network is no longer funded is still on the table
- What does this mean for the longevity of NTN?

- USGS funds approximately one-third of NTN.
- USGS needs to do a better job of promoting the network not only within USGS but also externally.
  - Needs to be a prolonged, robust effort
  - What does this internal outreach look like?
    - Integrate with USGS Water Dashboard (internal)
    - Map-based tool to click on sites and call up data for that site
    - NADP data are available, but do not pop up - requires clicking on an NADP link
    - Need to interface USGS and NADP databases to seamlessly integrate NTN data
    - Money left in existing agreement (analysis from cut sites) can be reprogrammed for this
- Bottom line: an ever-increased outreach effort needs to occur.
- A broader evaluation of the ROI for USGS with NADP needs to be demonstrated:
  - What do we have to show for our funding participation?
  - How is our contribution contributing to the broader scientific community?
- Questions/thoughts?

Discussion:

Kristi Morris – Ryan, we can certainly help you with the sub bullet #2 there about how what USGS pays for helps the broader scientific community. Historically USGS has cared about partnerships with other agencies and the data that you provide is used by FLMS extensively.

Ryan McCammon – Also, the train derailment study used some USGS sites - another example of why we need to be more proactive in terms of real time event analysis. In emergency situations/toxic releases, etc., we can quickly assemble an A-Team to do a forensic analysis on the event using NADP data. The train derailment study opened a lot of people's eyes that there was so much stuff in the water.

Mike Bell - Does the USGS have an office of communications, public relations? Having staff specifically trained in outreach, communication, and stakeholder engagement is very helpful.

RM - Yeah, so we do. We will put out a press release, and we'll highlight all the networks that have been affected by the cuts. So that's step one of a multi-pronged effort. I also reached out to a staff specialist handling social media posts for USGS and told her about air quality awareness week, NADP's role in it, and our connection to NADP.

Linda Geiser - Thanks for your explanation of what's happening. Federal agencies can negotiate a very low overhead cost with universities. Perhaps this can help? If you have some sites that do want to continue, maybe you can negotiate with the university there directly to fund that site at the federal rate instead of the ordinary.

RM - You're right. That'd be something. I would have to sit down with my contracting person, kind of discuss and hammer out how that would work. Good thought.

LG – This topic is coming up across agencies. We can organize a small group to work on pulling together some materials that we can use to stress the importance of the networks. I just heard Kristi say she can contribute. I know Aaron and I are really interested in this for the Forest Service. Maybe there's others that would like to work on something that we can use. We can develop together that will apply across the board.

RM – We also need a fact sheet for each site to drop to stress their importance, and the benefits of having them in a specific district. Aimed at Congressional staffers – we will not be advocating for funding but providing information.

Winston Luke – Hi Ryan, about the potential press release from your communications team – will it also mention the potential for all of your sites shutting down? Being proactive could generate a lot of support.

RM – I will follow up on that

David Gay – About your comments about getting data from our website to your website. I can't imagine that would be a problem. I think we can work with you and get it to you in a number of different ways.

RM - It could just be as simple as creating a script that would go in at certain times of the day or week, or whatever, and grab all the data and pull it in. It could just be as simple as that. A batch shell script.

Mike McHale – Yes, but we're not going to store the data in our own database. As soon as you do that, the data start to diverge. The data need to be stored in an authoritative database that we can then query - and that's definitely doable, I think. Okay, a couple of comments in the chat…

Greg Wetherbee - So a couple of things, Ryan. You didn't mention CAN5?

RM - We're going to follow up later on that one.

GW – It's a long-term international intercomparison site that we've written 3 journal articles on, so it's important. In terms of the data, USGS realizes that the data should not be replicated in its database, but we should take the products that are already on the NADP website and have them pop up automatically without having to drill down to them on the National Water Dashboard. So I think that we can make that happen with some effort. And so we're not talking about porting the data over or replicating it in any way. I think it's a very doable thing.

MM - The thing that probably resonates the most is getting a group of Feds together across agencies to talk about communicating the importance of this work. If we band together to formulate a collective product or response, that will help.

LG - Sounds like we need somebody from USGS and Fish and Wildlife Service.

RM - A quick side note - right around the budget meeting in July or first part of August. We'll do the program review at that point. I'll get with Nichole so we can hammer out some possible days to send everybody.

MM - Next up is Richard. I just want to say quickly, everybody in the program office and in the lab works very hard to make sure NADP is successful. And so I just want to single Richard out for a minute, as somebody who works really, really hard and I know we all appreciate him. But I just wanted to make a special point of saying he's running the slides. He's helping me to put agendas together. Basically his fingers are in everything, and I just want to acknowledge that and maybe give him a quick round of applause.

Website improvements/Daily precipitation volume data availability (Richard Tanabe)

Richard – As part of the program office review, it came up about the website, updates, and creating a precip network so that we could download data. I hoped to be able to give you a demo of the prototype website. But we're kind of tied to UW DoIt - they're the ones doing the programming. They weren't able to start until mid-January, and it has been slow going. So, we'll be able to demonstrate the live site in the fall. But we should have something online, and at least for the precip network and the other items. I'll cover more of the program office review, where we are with the findings, Thursday afternoon.

Mike McHale - Thanks very much. I think what Richard just talked about with the precipitation data, the way that's moving is going to make things easier to connect to agency websites. And if, on the USGS Water Dashboard people can click on a site and actually see the QA'd precip data, that will make people at the USGS very happy.

PFAS 12 Point Plan Update (Martin Shafer and Amy Mager)

- PFAS – Analytical Methods Update
  - Analytical methods: Targeted
    - Current precipitation method: modified ISO 21675. Isotope dilution LC-MS/MS, 33+ PFAS compounds. 24 isotopically-labeled surrogates. >500 mL sample, 8 samples/day.
    - Automated SPE (Oasis-WAX); ENVI-Carb clean-up. 1 set/day
    - SCIEX 7500 LC/MS/MS quantification, 1 µL LC injection.
  - Updates: (implemented for PFAS NTN Subnetwork)
    - 250 mL sample, 2 µL LC injection. The lower 250 mL requirement will significantly increase field sample yield and also minimize need for across week compositing.
    - Improved LODs (typically <0.05 ng/L)
    - Improved throughput (TWO SPE sets of 8 samples/day)
    - Improved data review through use of flagging scripts
    - Currently validating EPA 1633 (40 PFAS compounds)

- PFAS – Field Methods Update
  - Updates
    - ALL NTN PFAS sites are now BAG in bucket sites. (extensive field and lab testing showed no PFAS contamination and insignificant sorption of PFAS to the bag).
    - Methanol rinsing in the field is no longer required.
    - Return of the sampling bag from the field is also no longer required except when associated with a quarterly QC event (trip blank, field blank, field spike).
    - Improved documentation of field protocols (routine PFAS sample collection, Quarterly QC, bag folding, lid seal replacement).
    - Streamlining of field site provisioning.
    - These and other changes in-progress will greatly simplify field collections and substantively improve the efficiency of the PFAS network.
- WI PFAS in Precipitation Intensive 2020 - Design & Outcomes
  - Pfotenhauer et al., J.Atmos.Env.2022.119368: PFAS concentrations and deposition in precipitation: An intensive 5-month study at National Atmospheric Deposition Program-National trends sites (NADP-NTN) across Wisconsin, USA
    - PFAS in precipitation at 8 NTN sites
    - 33 PFAS compound method
    - Two studies: 91 Wet-Deposition samples
      - Spring/Summer 2020 - Background study at 7 sites (14 weeks)
      - Fall 2020 - Source study at 2 sites
        Marinette - temporary installation
        Trout Lake - permanent site
- PFAS in Precipitation: EPA-ORD Program
  - PFAS In Precipitation: EPA-ORD Pilot Program
  - "Long-term" Monitoring for PFAS at NADP-NTN sites
  - John Offenberg, John Walker, Melissa Puchalski, Doug Burns, Andy Johnson, Martin Shafer
  - Expand "synoptic" sampling using NADP infrastructure
  - PFAS in Wet Deposition:

- 2nd, 3rd, & 4th Phase Sampling 1st continuing until July 2024
  - 1st phase began with 6 sites
  - 2nd phase sites: KS97 (Kickapoo Tribe), NY06 (Bronx, NY), WI93 (Arboretum), WI31(Devil's Lake)
  - Three sites added in 3rd Phase: WY94 (Grand Tetons), AK03 (Denali), WA04(Umatilla Tribes)
  - 4th Phase sites: MN97 (Grand Portage), AL99 (Sand Mountain), NC25 (Coweeta), Choctaw Nation (2 sites) – 5 new sites total
  - Isolated sites: NY98, WY94, AK03
  - Rural sites: KS97, ME96, WI31, WA04
  - Suburban sites: NC30 (NC96,97)
  - Urban sites: NJ99, NY06, WI06
- Sample collection/processing
  - 921 precipitation samples have been collected & processed as of January 2024. Average field sample yield = 63.0%
  - Reasons for <100% PFAS Sample Yield
    - Dry weeks
    - Insufficient volume/pooled weeks
    - Debris contamination
  - Most extensive study of its type in scale and scope ever conducted.
  - Approximately 1/3 of samples are QC samples
    - Trip blanks, field blanks, field spikes, field co-location
  - Even at tenths of ng/L, see ~5-10% precision
- Key Points/Lessons Learned
  - Concentrations of individual PFAS compounds in precipitation are typically <1 ng/L, though levels can be significantly higher at specific sites/dates. However, the summed PFAS levels can exceed proposed water quality criteria.
  - Regional/background PFAS atmospheric deposition, even in the absence of a local source, may represent a/the dominant PFAX flux to both terrestrial and aquatic landscapes.
  - The carboxylates (PFCAs) dominate the PFAS composition of precipitation – primarily as a result of atmospheric processing.
  - Legacy PFAS compounds (PFOS, PFOA) are STILL major contributors to PFAS atmospheric pools
  - Will remain problematic due to high persistence, widespread contamination and atmospheric cycling.
  - With the appropriate datasets and modeling tools, one should be able to resolve point/local sources from regional/background levels and sources.
  - A comprehensive field and laboratory quality assurance (QA) program is absolutely essential to the production & documentation of high quality, defensible atmospheric PFAS data.
- Data Updates
  - Complete 2020-2022 dataset submitted to EPA (over 22,000 PFAS concentration records).
  - External data quality audit (by WSP) completed.
  - Further review of data within EPA-ORD completed and administrative clearance for pre-notification and data release approved.
  - Manuscript drafting can proceed in earnest. A priority effort over the summer/fall 2024
  - The PFAS analyses on all samples collected in 2023 are nearly complete. Of the 338 precipitation samples collected in 2023 from the 10 NTN EPA-ORD PFAS Pilot sites, only 33 samples remain to be finalized (90% complete).

        - The complete 2023 PFAS data set will be submitted to EPA-ORD and WSP (for external data quality audit) in late May of 2024.
    - Manuscripts In-Progress and Planned
        - Manuscript describing the primary PFAS data from the 2020-2022 dataset.
        - PFAS in Cloud Water and comparison with co-located wet-deposition. Back trajectories of principal cloud water factors. (with SUNY Albany)
        - PFAS in throughfall from Bronx Forest and comparison with co-located wet-deposition. Also comparison with litterfall. (with USGS)
        - Development of protocols & validation of field and laboratory infrastructure for PFAS measurement in precipitation.
        - Compendium of QA data from 3 years of PFAS in precipitation monitoring
- PFAS monitoring in conjunction with New Jersey DEP
    - Sandra Goodrow, Ph.D. & Luis Lim, Project Managers
    - 2 full years of weekly precipitation collections from the 4 NTN sites with plans for 1 full year of precipitation AND ambient air collections from Camden and Elizabeth sites
        - PFAS passive samplers in Year 2 at selected sites
    - NTN Sites:
        - NJ00, E.B. Forsythe NWR, started 07/2023
        - NJ30 New Brunswick, started 08/2023
        - NJ39 Cattus Island Co Park, started 06/2023
        - NJ99 Washington Crossing. Started 07/2023
        - Approximately 100 samples so far
    - Ambient air collection sites
        - Camden
        - Elizabeth
- USGS/New Mexico Water Science Center Collaboration
    - Erin Gray & Kimberly Beisner, Project Managers
    - Selected precipitation events over 2 years (2023 & 2024)
        - NM07 (Bandelier NM)
        - NM08 (Mayhill)
        - Albuquerque (New site, 2024)
- PFAS in Tree Canopy Throughfall
    - Two Ongoing Studies
        - Duke Forest (North Carolina)
          - March 2022 - Current
        - Thain Family Forest (Bronx, NY)
          - April 2023 – November 2024
        - 25 weeks with throughfall
    - Field sampling completed - 43 throughfall samples collected
        - Seven throughfall collectors deployed each week. Analyzed individually or pooled.
    - All PFAS analyses completed
    - All NTN-analyte analyses on throughfall completed
    - Litterfall also collected
    - Data analysis in progress, manuscript planned
    - Early indications – PFAS concentrations in throughfall can be at least 10X those in precip
- PFAS in Cloud Water – Whiteface Mountain, NY
    - With SUNY Albany
    - PFAS analyses complete (4 cloud water seasons)
    - Additional archived collector rinse and field blanks analyzed

- Collector blank and spike recovery tests in-progress
- Data analysis/back-trajectories complete
- Several presentations given at national meetings
- Back trajectory analyses to determine airmass "history"
- Manuscript drafted

- USGS-Funded Projects
  - Quantifying multi-media loadings of PFAS in the Great Lakes basin using targeted and non-targeted Analyses
    - Funded by USGS NWRI
      - Investigators: Remucal, Shafer, Corsi
      - 3-years, January 2022- December 2024
    - Use multiple techniques to quantify PFAS in tributaries, precip, open water, sediments to
      - Estimate partitioning within the water column
      - Provide point-in-time loading estimates, and
      - Perform source fingerprinting.
  - Tracing Atmospherically Deposited PFAS from Source to Sediment in the Great Lakes Region
    - Investigators: Frie, Ulrich, Shafer
    - 3-years, January 2023- December 2025
  - Atmospheric Transport of Per-and Polyfluoroalkyl Substances (PFAS) and its impact on Surface Water contamination
    - Investigators: Lohmann, Woodward, Shafer
    - 3-years, January 2024- December 2026
    - Using PFAS passive samplers and detailed chemistry to understand PFAS delivery to surface water samplers
- Gas and Aerosol–phase PFAS Measurements at Selected NADP Sites in Parallel with Precipitation Collection
  - At Eagle Heights and Devil's Lake
    - Triplicate Co-located Hi-Vols: Vapor and Aerosol Phase (typically quantified separately) PFAS
    - Duplicate Co-located N-CONs: Wet-Deposition (PFAS Dedicated)
    - E-Raingage
    - One-Year Intensive (April 2022 – June 2023)
    - Targeted Analysis (33 compounds)
    - EOF & NTA (selected samples)
  - In part a method validation process for High-Volume Air Sampling for PFAS
    - Precision
      - At least duplicate co-located samples from each collection
    - Accuracy/Recovery
      - Isotopically labeled surrogates (24) spiked onto substrates
      - Target compound (33) spikes – "special" sampler
    - Contamination
      - Field blanks
    - Sampling Variables
      - Air Flow Rate [120, 230 L/min]
      - Collection Period [24, 48, 72 hours]
      - XAD Mass [15, 20, 25 grams]
  - PFAS in Air
    - At both Eagle Heights & Devils Lake
      - 36 co-located (duplicate) sample sets

Primary and co-located Hi-Vols
- 20 “special” samples (3rd Hi-Vol)
- 8 field blanks
- 4 field target compound spikes

- 184 Total Sample Sets (aerosol and vapor)
- 24 Total QC Samples
- Analyses 90+% complete
  - Dual solvent (ethyl-acetate + methanol extraction)
  - Rotovap & Turbovap volume reduction (1 ml)
  - Clean-up on ENVI-Carb SPE cartridge
  - LC/MS/MS targeted analyses for 33 PFAS

- Atmospheric Deposition Receptors for PFAS
  - In soils and lake sediment cores
  - In undisturbed soils and seepage lakes these records provide historic picture of PFAS deposition
  - Sampled at UW Arboretum and sites in Devils Lake
    - Soil and lake sediment coring (through ice)
    - Cores sectioned at 1 cm intervals.
    - 25 sections Devil’s Lake, 40 sections Hope Lake. Approx. 1920 at base.
    - Dated the cores using 210Pb, 137Cs and 40K
      - Radiochemical dating of Devil’s Lake core completed and dating of Hope Lake core will be finished in May.
      - All sediment and soil core sections have been extracted, and PFAS quantified by LC/MS/MS in all but 5 sections.
    - Organic carbon, elements
  - Hope Lake sediment coring
    - Seepage lake
    - Receptor of emissions from Madison metro area
- PFAS Measurement Approaches at the WSLH
  - Much of the research focuses on what we are not measuring form targeted analysis
    - Only looking at ~40 compounds in targeted analysis, out of ~10,000 compounds
    - So, look at total organic fluorine to estimate total PFAS concentrations
    - Helps to put concentrations of targeted compounds into context
  - Use Combustion Ion Chromatography (CIC) for total organic fluorine (TOF)
    - Total PFAS (Absorbable Organic Fluorine, Extractable Organic Fluorine)
    - What fraction of total PFAS are we measuring with targeted methods?
    - Instrument system installed & validation complete
    - Assessment of EOF/TOF in various matrices underway
  - Combustion Ion Chromatography (CIC)
    - Total Fluorine (PFAS) in Precipitation
    - Now generating robust EOF data for precipitation samples.
    - Close attention to CIC baseline plus enhanced pre-concentration allows for adequate S/N.
    - CIC measurements are performed on SPE extracts of monthly volume-weighted composites of precipitation (typically one liter).
    - CIC detection limits in the low µg/L range, coupled with 1000x pre-concentration, results in sample PFAS detection limits in the low ng/L range.
    - Working on methods to confirm that levels of inorganic fluoride are low
- PFAS at WI State Lab of Hygiene (WSLH)
  - Organic Chemistry Department –Environmental Health Division
    - Regulatory PFAS research & analysis (drinking water, surface water, tissue, blood)

        - Original PFAS in precip work started in this group
    - PFAS Research Center (PRC)
        - PFAS in precip analysis moved to this group approx. 2 years ago
        - Method development
        - Projects include analysis in
          - Air, Soil/Sediment, cloud water, Litterfall, fire-fighting foams, wastewater
    - Work with research groups on campus
    - Staff
      - Emily Sellers - Chemist
      - Jared Kunick - Chemist
      - Iris Bloede - Chemist
      - Liz Marshall – Lab Technician
      - Katherine Pennel – Student
    - The two groups have/continue to work together on projects - sharing resources, ideas, etc.
- Re: 12-pt plan - Focus to date: PFN LOGISTICS (PFN: PFAS Network)
    - In January 2024 – year long pilot program; Exec to further examine plan
    - Supply Shipping
        - PRC for Regular PFAS Sample (PRC research projects) - now
        - NADP for PFN PFAS Sample when networks starts
    - Sample Receiving
        - NADP and PRC for both Regular and PFN samples - now
        - Sample compositing, paper work differences
    - Support
        - PRC for Regular PFAS Sample - now
        - NADP for PFN PFAS Sample when network starts
    - QC Sample Prep
        - PRC (PRC Ship) for Regular PFAS Sample
        - PRC (NADP Ship) for PFN PFAS Sample
    - Data Entry (Horizon system)
        - Horizon used extensively by WSLH Env. Health Division
        - NADP has its own LIMS system
        - PRC for both Regular and PFN samples
    - Data Review & Reporting (Instrument/Horizon)
        - PRC for both Regular and PFN samples
    - Export to NADP Database/Web
        - PRC projects do not report to NADP
        - NADP for PFN Samples
    - No Official PFN sites yet, but have been practicing with recent sites added to EPA/WSP project
        - AL99, NC25, MN97, OK24
    - Many NTN sites are collecting precip for PFAS, but these are special projects/programs
        - EPA/WSP
          - AK03, AL99, ME96, MN97, NC25, NC30, NC96, NC97, NY06, NY98, WA04, OK24, OKXX
        - NJDEP
          - NJ00, NJ30, NJ39, NJ99, NJXX, NJXX
        - NM/USGS
          - NM08, NM07, Albuquerque
        - Lake Superior
          - 12 sites

        - MN Sea Grant
          - 6 sites
    - EPA/WSP Project will cease Summer 2024
        - Makes sense to convert these sites to PFN sites
        - Summer/ Fall? TBD
- Where are we?
    - Start-up/support of new sites – coming along fine
    - Sample Receiving – processes in place, proceeding well
    - PFAS Analysis
        - Number of sites PRC can accommodate?
          - 15-20 with current setup (staff/instruments)
        - Other projects in PRC
    - Data – Not assessed yet
        - Horizon to NADP database
        - Additional Review/Coding
        - Reporting
        - Website
- Considerations/Thoughts/Next Steps?
    - Costing
        - PFN costs are in correct ballpark for site logistics, analysis
        - Need to assess data resources
        - Need ability to re-cost analysis as go along
    - How many sites? How fast?
    - Other projects in PRC
    - Exec input on 12-Pt. Plan
    - Further Discussion 11:00 – 12:00 today

PFAS update (Melissa Puchalski and John Offenberg)

- John began by calling up EPA's website on PFAS substances and the Final PFAS National Primary Drinking Water Regulations
    - PFAS, perfluoroalkyl substances has been a subject of interest by the USEPA.
        - This is largely human health focused, drinking water focused.
        - There have been a couple regulatory developments over the past few months
          - If questions, contact your regional science liaison, your regional tribal liaison
        - That goes for states, tribes, locals, other federal agencies, etcetera.
        - Large amounts of money involved, and big implications
    - Two major regulatory steps are underway, one of which is adding a list of compounds to the Safe Drinking Water Act.
        - 6 compounds are in the process of being listed in the Safe Drinking Water Act
        - Equivalent to adding a new NAAQS, X National Ambient Air Quality Standard.
        - There are no discussions of air regulations at this point.
        - Safe Drinking Water Act is human health focused
          - Roughly 100 million people will be impacted by the standards that have been set
        - There will be treatment needs.
        - There will be regulatory impact.
        - The standards are in the single digit parts per trillion for drinking water
        - Very low concentrations – maximum contaminant levels 4-10 ppt
          - Municipal water supplies need to figure out how to reduce concentrations to that level

- One tool is granular activated carbon treatment and the regeneration thereof
- Even 4 parts per trillion in many locations in the US will be difficult to achieve
- Some of these compounds are observed in precip, cloud water, and throughfall

- PFOA and PFOS Listed as CERCLA Hazardous Substances (Superfund listing)
  - Again, these are observed in precipitation, cloud water, and throughfall, etc. and are being added to Superfund.
  - Internal/external legal letter specifying which entities will be subject to Superfund status with regard to PFAS compounds
  - Very important distinctions
  - EPA does not intend to pursue entities where equitable factors do not support seeking response actions, and liability concerns
    - Publicly owned sewer systems, municipal solid waste landfills, publicly owned airports and local fire departments, farms where biosolids are applied to the land
- Publicly facing EPA Analytic tool.
  - It's the repository of all data for PFAS.
  - Map depicting locations of all of locations reporting PFAS data/contamination
  - A lot of it is water tissue, soil sediment, others
  - No data for air concentrations
  - For those working with NAAQS and HAPS, you're accustomed to thinking and talking about the national emissions (to air) inventory
  - PFAS are not part of that process yet.
  - Some states are starting to work on it
  - A reasonable assumption about which facilities/locations may be emitting PFAS to air would implicate those places that make it and use it on a big scale
  - Are we talking gram scale or ton scale of emissions And the NEI looks at one end of that spectrum, TRI has a different threshold
  - Federally owned sites with suspected PFAS contamination may employ incineration to clean up the sites, so those may be PFAS emission sources going forward
  - Similarly, the activated carbon and regeneration method mentioned earlier to clean up drinking water - if there is incineration or a heating process involved in the regeneration, there may be an emission to air and currently there are no air federal emission regulations

Discussion:

David Schmeltz – Where will the pilot site data reside - as part of the ORD supported research?

John Offenberg -Yes, the 2020 through 2022 data has undergone QA audits by WSP and then has come into ORD and is going through a clearance process. It has a digital object identifier, a DOI, that has not been publicly posted yet. We in ORD are under the presumption of public posting in Science Hub. It will be publicly available. We haven't worked through this yet.

Aaron Pina - Beyond just engineering approaches, are there any other kind of natural approaches, like phytoremediation, that have been considered?

JO - There is a lot of work ongoing in ORD. Water-focused, soils-focused, groundwater-focused, remediation-focused incineration, destruction, etc. The 12 other people doing PFAS work are all doing emissions measurement technique development. There is likely a need for a promulgated emission to air measurement. There are two other test methods. OTM45, which is a modification to include PFAS, and something that's very similar to method 0010

or modified method 5 which is a filter XAD trap, multiple impinger backup filter, similar to how dioxins or other organics emissions are measured.

AP - Those are engineered machines using filters, I'm asking about more natural based approaches, like phytoremediation using trees, etc. Is that being pursued?

JO- I have no idea that's a whole other program. ORD is starting with emissions to air the little bit that we've been funding and doing with ambient air and precipitation and cloud water is it so far.

Melissa Puchalski – Amy showed a slide saying that the EPA (PFAS) sites would end…can you say anything about this?

JO – To my knowledge, we started this in 2020, trying to front load a little bit with some cash, two years of (running) 4 sites, and we've been rolling towards annual funding for continuing the roughly 10 locations and 12 sites. I only have 2023 money that goes roughly to the end of December 2024. Every dollar I get for 2024 funding will be continuing those sites. I intend to keep doing that as long as I possibly can. Personally, I would love to see this get to an established network. What that entails for our agency and ORD funding versus a program office funding, I have no idea. Our agency deals with human health much differently than ecosystem impacts.

Mike McHale - I think we're officially into the discussion part of this morning. So I just wanted to open it up also, I mean, I don't want to shut down any discussion with John, but if people have questions for Martin, Amy, or Melissa about the NADP side of this, please. This is the time to discuss that as well.

Unknown - Yeah, just kind of curious how important is the transport of PFAS in the air to the PFAS water quality problem? Is it mostly a runoff issue? Or is air transport and deposition one of the leading causes of water contamination?

JO - We do not yet know. From what Martin has described and what I've presented previously, there's likely an air pathway for some portion of this. Is it 1% or 99%? We're not there yet. The cloud study indicates also, there may be impacts at high elevation and top of the ecosystem. Very similar to the throughfall set of implications that Martin touched on.

Martin Shafer – There have been a few studies that have addressed PFAS mass balances to certain terrestrial and aquatic system. So, for instance, in Lake Superior, there is historic data that suggests that, depending on the PFAS compound, 30 to 50% of the PFAS loading to that lake is via the atmosphere, and that's not unexpected, given other POP type studies. For instance, in the Baltic, similar kind of percentages are from wet deposition. Dry deposition adds a whole other kind of (loading) that would mostly wind up in the tributaries, and from some sub studies that have done some of the soil coring and looked at the inventory suggests that total atmospheric deposition can represent most of that deposition to that terrestrial environment. So we're not talking trivial impacts.
MM - Greg, did you have a question?

Greg Wetherbee - Yeah, I'd like to focus this discussion on how it affects the NADP. Specifically, the information that Amy presented is not in the 12 Point plan. How does this all affect the data review process which Zac will talk about? All this is a lot of data. It's complicated. It has a lot of QC associated with it all has to tie into quality ratings of the data. There's also a lot of SOPs that plan points to that aren't prepared yet…

MP - Greg, thank you to the review team for a really great review, and I think what Amy presented we can incorporate into the 12 point plan, and it should continue to evolve during this transition phase, as we learn more about staff and resources.

Mike Bell - One of the comments that we discussed last week during the review process was to provide a potential solution. Has NADP or the program office ever looked for outside funding grants positions to fund someone who could do the database construction, creation flow process, or something for previous networks or previous projects. So we're not pulling on current staff. But we could identify an outside funding source to provide this that we can then use into the future. Is there any structure in place it's been used before? Is that an option for us to pursue? Do we know of any potential funding opportunities that could help us get there without straining staff past their current limits?

Krish Vijayaraghavan - What is that funding requirement per site?

Amy Mager - I think the PFAS measurements are about $22,000. Related to Mike's question, we in NADP and the state lab have tapped into the Association of Public Health Laboratories (APHL) and in our case we've gotten a data fellow (Jean Steele). She has come on to help us with some of these improvements in things we've been doing for the standard NADP data. So we could pursue something like that (for PFAS database creation, etc.). These people are really bright, they come in and help us. The only consideration is that the fellowships are for 1-2 years, and then they're done, but the work doesn't go away. So that's something we have to consider and keep in mind.

MM - But I think, for updating SOPs, or maybe drafting an initial SOP maybe you don't need somebody long term?

David Gay - Back to the cost question. I've been advertising the price of PFAS at $22.5 K per site per year for the analytical fee, but that requires an NTN site, so that's on top of the NTN charge.

GW – My concern is - are other agencies going to pay for this PFAS initiative and then take out money for existing sites? I hope not. The intent is to build the NTN with this program because you need an NTN site to make it all happen.

DG - I agree with you. But I think most of the PFAS sites and the money will be new money – it won't be stealing from others.

MP - David, do you know how many new NTN sites have started to add PFAS?

DG - Well the two tribal sites in Oklahoma. They're talking about starting one in Minnesota. New Hampshire is talking about starting one new NTN site and adding PFAS at NH02, so there's three or four. EPA Region is talking about starting four PFAS monitoring sites, two of which are current NTN sites and two of which would be new.

Zac Najacht - If we went to some outside source to get initial funding and bring somebody in for development and implementation of the of the beginning parts of this process that, just like APHL, we need to figure out long term and maintain the ability to keep that going. We need to get as much information into this plan as we can. It's great APHL is great if that program continues and we can keep bringing in people like that. But I think we need to talk as a group on how we can maintain that level (of effort) going forward as PFAS looks to build.

AM - I just want to make it really clear, but the actual review of the PFAS data and all of the QC within the run and that is all still happening by our PFAS analysts. So I just want to make sure that people don't think NADP is taking that part on. We could consider maybe a stepwise process where first we pull the PFAS data out of Horizon and we get it into the NADP database on the web. I think that's fairly simple. And then maybe the next phase is bringing in the additional coding and perhaps qualify this PFAS data as we did for NTN, or not, etcetera. So that might be a way to get it going, but not be such a big upfront task.

KV - Still on the topic of funding the given that the PFAS network is going to be a pretty wide regional deposition network, We're hoping it can be used for understanding regional background wet deposition. If you think about industrial sources, emitters of PFAS may be interested in characterizing the regional background - if you have observed water contamination near a site, it is important to differentiate between local and regional background contributions. That is 1 area where I think this network could provide some powerful data. So I'm wondering if we want to consider looking for industry teaming partners?

DG – Krish, excellent idea. I agree with you 100%. We ought to ask some of the manufacturers or producers to fund part of this network . It's an excellent idea we should follow up on.

JO - I think there's also an opportunity potentially with state, tribal, local, municipal - whoever ends up being the regulatory or enforcement set of participants - the monitoring that occurs when something has been decided, the letter written, the agreement signed, the follow on monitoring.

KV - The post compliance monitoring you mean. Yeah, right.

DG – I see cities that drink surface water as a quite large source of potential monitoring in the future.

Dirk Felton - I agree with that. I just sent an e-mail to I think the guy who runs the New York City watershed for drinking water and the reservoir system there. There's a bunch of them that just failed for PFAS on the initial round of testing.

MM - But by the same token, they may not make a move until they actually are required to.

JO - They may be required to under the Safe Drinking Water Act - if they're above the PFAS drinking water limits being promulgated, they now have marching orders and should be considered as partners.

MM - Correct. Are there other folks that are on the review team or other people who have any concerns or questions about the 12 point plan?

John Walker - I just wanted to reiterate a point that came up during the review, which is that because we're thinking about implementing this new network that is the most expensive network under the NADP umbrella thus far - this may require a more detailed plan than those in the past. So we've reviewed it, we've made a set of recommendations. It may take a little bit longer because more detail is required in this plan than typical.

GW - I like Krish's idea. How about DoD and DOE? Why aren't they in NADP? It has been a long time since DOE has been in NADP - we have to re-engage them. This will require the program office to do the required outreach. I think the plan needs to reflect a better way of how this is going to be marketed and funded, and if that means reaching out to industry as well I think that's great. We used to have a lot of more industry involvement in NADP. That definitely should be in the plan and there should be a strategy for how that will be done.

JO - Greg, I think you're entirely right on DoD. The number I've heard is roughly 700 airports, the estimate that have soil and surface/groundwater contamination issues. Setting up a monitoring effort to make sure that the clean up process does not create additional or larger or different geographically-spread sets of issues makes sense. I think there's also an opportunity with USDA. The CERCLA Superfund call out was not about private farms with biosolids, there are additional issues that concern other agencies.

MM - Any other comments? Questions?

LG – I did want to ditto what was said about broadening the base of support here. I wanted to mention DOE again. They have a bunch of sites that they're cleaning up and they have to demonstrate to the communities around them that the water there is now safe, and the air is safe, and so forth. So I think that DOE should also be included in the 12 point plan and we need to get some contacts from there.

GW – Another issue on the 12 point plan is the mention of password protection of data. Taxpayers need to have the data. We are an open organization that believes in free and open exchange of data, so it's got to be public information if it's coming out of NADP.

JO - Greg, does that apply as well to consent decree or settlement sets of data issues?

GW – We're a research network, not a regulatory network. I think the PFAS data needs to have appropriate caveats that it is research data for long term maintenance monitoring of the environment.

Chris Rogers - I really was going to say something very similar to what Greg just said about data availability. And I think (casting a) wide net and bringing in lots of different participants is great, but good luck getting an industrial participant to want their data to be publicly available, especially on a really quick timeline. So I think that's really key to what we do in all of these networks and it needs to be a focus that's maintained as we move forward with this is that the data need to be out there for everybody

KV - With respect to getting industry to pay for a station, that would be very intentional there. It would not focus on deposition due to an industrial source. It would be regional background deposition that would clearly not be due to a particular source. So it is in their best interest also to show background contributions. So just wanted to clarify that.

Bret Schichtel - In the IMPROVE monitoring program, we have outside agencies that fund individual sites. It's a separate contract. We do make the data publicly available in every case, but we don't have to.
So you could have industry come in to fund Wisconsin to operate a site. Wisconsin could charge a little extra that goes back into the NADP program and then they can get their data. So you could still have that helping the program in a broad basis and make the data proprietary.

MM - OK, we are at lunchtime. I encourage people to continue this discussion while they eat their lunch. We are going to be back in this room in an hour and a half for NOS this afternoon. So thank you everyone for your participation.

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Joint Agenda (Session II)
Thursday May 2, 2024: 01:30-05:00 CDT

1:30 PM	Welcome (Mike McHale)
1:40 PM	Subcommittee Highlights-Motions Only
	MELD (Colleen Flanagan-Pritz/Katherine Ko/David Schmeltz)
	TDEP/CityDep (Amanda Cole/Colleen Baublitz/Kristin Foley)
	CLAD (Nifer Wilkening, Jeremy Ash, and Kris Novak)
	Ozone Working Group (Jeffrey Herrick/Kris Novak)
	AMSC (Andy Johnson/Selma Isil)
	NOS (Mike McHale)
	EOS (Rebecca Dalton/Chris Rogers/Emmi Felker-Quinn)
	DMAG (Mark Kuether/Zac Najacht)
2:40 PM	TDEP Workshop Summary
3:00 PM	Break
3:20 PM	CAPMoN Update (Jason O'Brien)
3:35PM	QAAG Update/ QA Report (Nichole Miller)
3:50 PM	2022 PO Review Findings and Response (Richard Tanabe)
4:00 PM	Spring Meeting 2024 (Winston Luke)
4:05 PM	2024 Fall Meeting and Scientific Symposium (Melissa Puchalski)
4:10 PM	Wrap-up (Mike McHale)

Mike McHale - OK, it's about that time. I do want to circle back to a motion that we talked about in NOS – that had to do with the lid weights on buckets. Eric (Hebert) had suggested weighing the whole bucket with the lid on it to reduce contamination.

The motion that Eric and I came up with in consultation with Richard and David is to change the NTN bag sampling preparation and bag sample change out SOPS to weigh the bucket with a lid on it, with the change to begin on January 1, 2025. Richard indicated that's when this kind of change should go out. Plus it gives us a little time to refine our plan. After all site operators are informed of the change, this will also require a change to the

FORF so the observer can indicate that the lid was included in the bucket weight. These details will be worked out to make the most sense for operators and lab.

Mike Bell – Should there be provision that the SOPs will be revised by the fall meeting, so we have like a check mark of whether this starts in January or not.

MM – Yes, that's a great point Mike. So I will change it. We'll make sure that by the fall meeting the SOPs have been updated. Any further discussion, concerns, comments? Anything online, does anybody see any hands raised or comments?

Tom Butler - I have a comment. So when you weigh the bucket with the lid on, that lid is put on the bucket that I take off. So it's a different lid weight…

MM - We're saying we would keep the same lid with the same bucket. So you're taking a lid out from last week to put on the bucket and weighing with the new lid, so it wouldn't be two different lids. Richard suggested we weigh 100 lids and see how much variation there is because it really might not make much of a difference at all.

TB - Seems like it's about variance.

Kulbir Banwait - For weekly samples, if the difference in lid weights is very small that is fine, but at sites where there is not much precipitation that may cause more error in your volume calculations. And if you weigh the bucket with the lid then take the bucket and lid to the sampler, hopefully you won't drop the lid. If you drop the lid, you must have SOPs for all that.

MM - OK. I appreciate that. The idea is actually there would be less contamination bringing the bucket with a lid on it to the site, unless you drop it, in which case you need a new lid. OK, so I've changed the wording a little bit.

Motion:

Change the NTN Bag Sampling Preparation and Bag Sample Change-out SOPs to weigh the bucket with the lid on it with the change to begin on January 1, 2025 after all site operators are informed of the change. This will also require a change to the Field Observer Report Form so the observer can indicate that the lid was included in the bucket weight. Changes to the SOPs and the FORF will be made by the Fall 2024 meeting.

Moved by Mike McHale, second by Eric Hebert

Motion passed, one opposed (on line)

NOTE: THIS MOTION WAS TABLED IN EXEC TO ALLOW FOR FURTHER STUDY

Subcommittee Highlights and Motions

MELD (David Schmeltz)
MELD had a very productive set of meetings, no motions. About 25 people in the room and 40 online.

The first part of MELD focused on passive mercury monitoring and progress towards developing a network capability. Analytically the lab can do this, the PO can support this. To start, costs could be ~ $4000 per site per

year, costs could come down if the lab is able to make the samplers themselves. The National Park Service and EPA have some seed money and plan to launch a 5-site pilot network in partnership with several tribal nations and states that are interested. We'll continue to update our 12 point plan.

The second part of the MELD meeting covered the Minamata convention and the effectiveness evaluation - we heard some interesting presentations and had good discussion around what data may be needed for a robust US based effectiveness evaluation. We are producing some maps that will show where our monitoring assets are aligned, so where the air deposition and monitoring is co-located with mercury monitoring in other matrices. So there will be some new products coming out from the MELD team.

TDEP/CityDep (Amanda Cole)

- TDep Virtual Meeting April 24 – Highlights
    - TDep maps/grids from v. 2023.01 are on the website. Trend movies will be updated next (currently use 2022.02). 2018.02 grid files are no longer usable in ArcGIS and will likely be removed.
    - TDep Map Fact Sheet: working with EOS for approval, formatting and publication
    - Agricultural Stakeholders Webinar Series planned for Aug-Dec period:
        - Webinar 1: Introduction to nitrogen deposition for agricultural stakeholders
        - Webinar 2: Case study examples of nitrogen deposition research
        - Webinar 3: Best management practices for ammonia emissions and nitrogen deposition
    - Research updates:
        - Greg B./WSLH recruiting APHL student to work on various TDep mapping-related projects
        - Precipitation sampling across Toronto this winter as part of SWAPIT
        - NPS evaluation of SNiPiT and algal blooms this summer/fall
        - EPA/CSU looking at black carbon at 12 western NTN sites this summer with goal of evaluating smoke impacts in historical data
    - TDep up for 4-year charter renewal at Executive May 3
    - No motions

Greg Beachley - I just wanted to point out that the 2022.02 maps are not on the website.

Amanda Cole - So what's in the archives?

GB - The archives are the 2018.02 version. It's confusing.

CLAD (Jeremy Ash)

Mainly focused in on some project updates - hearing and seeing some demos of the new critical loads hub tool that Linda Pardo is leading along with NADP, her CLAD tool and as well as updates from National Park Service on the conditions and trends data and the incorporation of critical loads into that public facing tool.

A short session in the morning on some Canadian critical loads efforts and a couple talks related to some recent research coming out of those efforts.

In the afternoon a longer session focused in on nutrient loading and harmful algal blooms as well as cyanobacterial blooms.

These are sort of broad range of talks, some of them very research focused and others also hearing from some folks from the Land Management agencies on the management side of dealing with these sorts of algal blooms and how they're impacted by nutrient boating.

We had a presentation from Chris Clark on some new critical loads results that are incorporating of course nitrogen and sulfur deposition but also ozone and as well as accounting for precipitation and temperature fluctuations on the growth and survival of tree species. So a really rich data set coming out of that effort will be available soon.

One motion to nominate and elect Hazel Cathcart (ECCC) as the incoming secretary for CLAD.

Kris Novak (secretary) will cycle into the Co-chair position with Jeremy Ash.

Nifer Wilkening, current Co Chair of CLAD, will be cycling out of the CLAD executive team. And we really appreciate all of her efforts and contributions over these last years.

Ozone Working Group (Kris Novak)
The group is working with some of the FIA data that Jeremy had just mentioned that Chris Clark was talking about. It's the A1 data set that's headed up by Emmi.

A kickoff workshop (virtual) for the review of the Ozone National Ambient Air Quality Standards will be held May 13th through the 16th. In particular May 13th and 14th might be of interest to some folks here from NADP. The 13th is the atmospheric sciences and exposure and on May 14th we'll be discussing the welfare related effects - those that are related to the secondary standard and ecological effects.

We want to have a more in-depth discussion around exposure response and ozone metrics, in particular looking at ozone fluxes and relating them to ozone effects in ecosystems. We are considering this for the coming months or potentially as a session at the Fall meeting if we can.

AMSC (Andy Johnson/Selma Isil)
Working on some issues finalizing the fact sheet - we passed a copy around earlier this morning, so you could see what that was like. So that's a good accomplishment thanks to Selma's efforts in WSP.

Also working for about the past year to come up with a data management scheme. The premise is that people will be collecting aero allergen data from whatever network or organization, and maybe even individuals. But there is no unified way of pulling all that data into one data system. Attempted to work on this and to get more people involved in the AMSC by breaking up into small work groups and pick different categories of the various data management elements, to formulate codes for things such as site location information, type of sampler used, collection medium (e.g., glass rods or tape), etc.

> Logistically a challenge to try to pull those people's schedules together to meet every two weeks to meet every two weeks to keep momentum going.
>
> We held ~2-3 meetings from last summer to early fall before the fall meeting
>
> It became apparent that actual process was just not really workable with everyone's busy schedules.

Instead, attempt to find just a handful of individuals (~3-5) to work on everything as the data management work group. This would be a lot easier to coordinate (fewer) schedules.

ASMC will follow up on this as well.

No motions and there is a call for a new chair

NOS (Mike McHale)
Ryan McCammon (USGS) went over the effect of the budget cuts and how we're going to deal with shutting some sites down. They are basically down now – it had to happen immediately. Discussions about retrieving the equipment and who that equipment belongs to.

Zac talked about the data review and his changes to the data review process and indicated that he is already using the new methodology. It's still being worked out, but essentially the pieces that can be put in place have been put in place and there was some discussion about updating the SOPs as soon as that methodology is finalized.

Mark Kuether talked about his work correcting some historical precip data. There was more discussion about documenting what he's done and what records were affected. Pretty much the information is there, it's just a matter of documenting and capturing what was done for future generations so people can look back and know exactly what happened to those records.

EOS (Rebecca Dalton)
No motions

Highlights:

Discussed Air Quality Awareness Week, which will be happening next week. We have NADP- specific posts already on our web page.

Had a promising discussion about preparing handouts or presentations with local success stories and regional data for advertising and marketing and NADP.

Talked through possible avenues for how to increase our reach on social media and how to bring in some expertise from folks who are already doing really great things with social media and how we can lean on that.

That was followed by a round Robin discussion from all of the committee chairs

Our committee chair meeting is scheduled for July.

Finally, discussed moving the governance handbook from PDF on the web page to HTML. All of the committee chairs will review it before our next meeting and we expect to have a motion in the fall to make this move.

DMAG (Mark Kuether)
Welcomed Jean Steele as our new APHL fellow and Nathaniel Be rner helping with our team.

So on the review process change, basically we're just starting out now and reviewing that - the group had discussion on the best way to make sure that this change doesn't affect the underlying data and some people suggested we do like a one to one comparison, so we're looking into that after the meeting.

Other improvements - data entry, we're just starting to look at using OCR technology or AI technology possibly to look at the data entry forms and reduce our labor there

On the front of the gap in the mapping We're starting looking at the proactive monitoring for future gaps, getting that handle on that earlier by those reports and outage maps. Other map updates are going to include corrections to the precip maps which we discovered last Fall Meeting and the NH4 maps which are overdue. And we've had a request to build animation maps, so we're going to be looking at the web updates.

Web updates - our web has had some problems with its charting and download capability over the years and the UW Do It web development team is currently working on resolving those issues, and also part of the charge is building that precipitation network to make getting precipitation data easier.

And the change logs for the MDN and NTN networks have been published so you can see what's been updated in the web data.

And again, the data logger offset issue.

The AMoN site is still dynamic, but Zach and I will be getting together to generate an SOP on how to do the final check on that. So then we can put it into a static table and then it'll be more in line with our other networks.

TDEP Measurement Workshop (Kristi Morris/Amanda Cole)

- Two panel Sessions
    - The morning session was focused on reduced nitrogen and dry deposition and the afternoon session was focused on total nitrogen and total phosphorus measurements.
- Main Take Away Messages
    - Need for more monitoring (reduced N, flux measurements, total N, total P) while agency budgets for monitoring are declining
    - Messaging and communication are important!
        - For EPA, it is an air quality and human health issue (NH3 and PM2.5) AND a deposition and ecosystem protection issue
        - Explore connections to C cycling, H2S, methane, climate, environmental justice and nuisance issues for funding opportunities
          - i.e. dust and wildfire have been exacerbated by changing climate
    - Tiered monitoring approach for total deposition
        - 3-4 multi-organizational supersites, with common measurements and protocols
        - Lower cost regional sites
        - While sustaining current long-term sites
- Workshop Products
    - Workshop Report
        - Summary of presentations
        - Panel discussion topics
        - Future work: white paper
    - White paper
        - Need for additional N & P monitoring

- Propose framework for tiered monitoring approach for new funding (NSF? NASA? DOE?)
- Schichtel, Walker, Fisher, Collett, Florian, Pina, Beachley? Puchalski? Cole? Others?
- Reach out if you are interested in being involved

Amanda Cole - Greg Beachley has proposed splitting the TDep maps into one ongoing trends-focused product where we aren't necessarily incorporating these new measurements, and one that would be more of a research focus. So when we talk about incorporating these new measurements, the idea is to develop that as a separate branch of the TDep maps for particular applications or just to see the impact, whereas we would not want to introduce new measurements to the trends product without careful thought.

NOS - Bi-Weekly NTN Sampling – Update

Mike McHale - Greg Wetherbee brought up the idea of going to two week sampling for NTN and so as NOS chair I'm planning to form an ad hoc committee to investigate that further, starting with the budgeting piece of it which I will work with David to have ready for the budget meeting in July.

Initial list of ad hoc committee members: Greg Wetherbee, John Walker, Kristi Morris, Melissa Puchalski, Tim Sharac, Nichole Miller, Zac Najacht, Greg Beachley, Noel Deyette

The ad hoc committee will investigate this and report back especially to the federal partners as we go along to it. If there are any federal partners that aren't represented on the ad hoc committee, we would make sure that they know what is going on.

CAPMoN Update (Jason O'Brien)

- Network Overview
  - Measurements/Operational Sites
    - Precipitation Chemistry – 24 (~2/3 daily, ~1/3 weekly) - transitioning to weekly
    - Aerosols and Related Gases – 17
    - Ground Level Ozone – 17
    - PM2.5 and PM10 Mass – 1
    - Continuous PM2.5 – 1
    - Mercury in Precipitation – 5
    - Total Gaseous Mercury – 3
    - Passive Ammonia – 3
    - Continuous N Species and SO2 – 2
    - Additional partner networks for GHGs, remote sensing.
  - Co-located NADP Measurements
    - AMoN – 3 sites
    - MDN – 5 sites
    - NTN – 1 site
- Laboratory Updates
  - Current backlog (COVID) for precipitation samples <200. Estimate completion May. 2024
  - Current backlog for air filter samples (particles/gases) ~40,000. Estimate completion Mar. 2026
  - Quality assurance study is still ongoing to assess stability of long term storage of precipitation samples.
  - Preliminary results are positive with good stability (except for pH)

- Testing new ICP delayed, restart July 2024
- Precipitation sample bag testing (chemistry) from new supplier
- Field testing of several lots of Nylon filters completed summer 2023
- Upgrade of lab computers and instrument software by end of 2024
- Additional lab studies on hold as resources focused on sample backlog

- Field Updates
  - Sites remained >95% operational in 2023.
  - Full schedule of field audits anticipated for 2024.
    - Some were postponed due to wildfires in 2023
  - Precipitation sample bag testing (physical) from new supplier.
  - Continued upgrades to the D400 precipitation collector
    - Development of prototype based on datalogger control
  - Bratt's Lake, SK resumed measurements in Oct. 2023
  - Temporary site installed at Searchmont, ON and measurements began in Feb. 2024
  - Testing and evaluation of new ozone instruments
  - Ongoing testing and evaluation of continuous PM2.5 instrumentation
  - Low cost PM2.5 sensors (PurpleAir) to be installed during site audits this year
  - Weekly air sampling method development and testing is ongoing
  - Site decommissioning (Westport, ON and Kinghurst, ON)
  - Conversion of two additional sites from daily to weekly precipitation sampling. Planning for additional in 2024-25.
- Data Updates
  - CAPMoN data sets available on the Open Government Portal
    - https://search.open.canada.ca/data (Hint: Search "CAPMoN")
  - Finalized weekly precipitation data review process and re-released 2017-2019 precipitation files with both daily and weekly sites
  - Submitted 2022 ozone data for consolidated publication with NAPS sites
  - Published 2019 air filter pack data
  - Published 2019-2020 TGM data
  - Published 2022 NH_3 passives data
  - Blank- and temperature-corrected, replicates averaged. Links to NADP AMoN for original data.
  - Published 2015-2019 continuous N and S data from an oil sands downwind intensive site at Pinehouse Lake, SK
  - In-house data QA-QC is well underway, with ozone already transitioned and precipitation and AFP transitioning this year
  - Internal IT processes are slow, but continuing to move forward on tablet-based electronic sample history forms. Expect to field test this year.
- Publications
  - Feng, J., A. Cole, G. A. Wetherbee, and K. Banwait, 2023: Inter-comparison of measurements of inorganic chemical components in precipitation from NADP and CAPMoN at collocated sites in the USA and Canada during 1986–2019. Environ. Monit. Assess., 195:1333, https://doi.org/10.1007/s10661-023-11771-z.
  - You, Y., J. O'Brien, A.S. Cole, L. Zhang, Z. He, Z., J. Feng, S. Pearson, 2024. Contribution of emissions from the oil sands activities in Alberta, Canada to atmospheric concentration and deposition of nitrogen and sulfur species at a downwind site. Environmental Pollution (under review)

QAAG/QA Update (Nichole Miller)

QAAG

- Site support and Site Operations Updates
  - Keeping site audits in line with the EPA budget; Vid is handling the AMNet audits
  - Eric Discussed the scope of the field audit and the following criteria:
    - Chemical manufacturing facilities within 20 km of the site
    - Electric generating stations within 20 km of the site
    - Major NH_3 emission sources within 20 km of the site
    - Mining operations within 20 km of the site
    - Checked upon initial site setup, not addressed/verified in ongoing site audits
    - Need to identify ways to reach out to operators to ensure no major changes at a site
  - Siting criteria reports on the websites
  - Maps for sites in jeopardy – Thiessen polygons (initial maps made by Tim Sharac)
- Wind Rose Plots
  - Consensus (besides MT95) on sites being offered a waiver to change collector orientation
  - Next step: pass this information on to site sponsors
  - Work on a change log for the website to include equipment and other changes in a site's history
- External QA, collocation, field audits, and system blanks
  - Loss of one lab for the NTN intercomparison program
  - Loss of one lab, but gain of two labs, for the MDN intercomparison program – net gain of one lab
  - Data has been provided for the collocated study
  - First half of Field Audit samples (USGS) have been sent out, second half to be sent out in July
  - System Blank samples (prepared by WSLH) will be sent out soon – mid summer?
- Lab investigation projects
  - Hg passive samplers
  - Two week MDN sampling
  - TN and TP research – smaller study with NPS should start soon
  - AMoN Alpha samplers
  - MDN bag testing
- PFAS update
  - Field and lab testing on bag sampling complete
  - Removed the methanol rinse
  - All PFAS sites (close to 30) are using bags
  - Have over 1400 PFAS collections and 400 QC samples – data release soon
- Data review streamlining
  - Altering the NTN data review process
  - Reduce the amount of samples that need to be opened and reviewed
  - Currently in the testing phase and will compare with the old method before implementing
- QA documents, audits, and mdls
  - 2022 QAR in external review
  - Internal audits – complete
  - External audit – 2024. August? To align with Budget Committee meeting
  - Network MDLs remain the same for 2024 data

QA Update

- QA Documents
  - 2022 QAR
  - Internal Management Review – across WSLH

- Evaluating resources, communicating across groups
- Ensure completion of issues from previous year's review, etc.

- SOPs
  - Updated in internal system, will send out before external PO review
  - pH and Conductivity SOPs, overhaul for move to Ag Drive
  - Write up flask, pipette verification SOPs, etc.
- MDLs
  - Lab and Network MDLs have not changed for 2024

- PT Samples – ECCC
  - Some samples rerun for confirmation of initial results
  - pH rerun
    - 23004415: 5.79 (AD=0.03)
  - ICP reruns
    - 23004406 (Na): 0.0447 (81%) – only sample to not show improvement on rerun
    - 23004407 (Na): 0.2047 (94%)
    - 23004407 (K): 0.0202 (96%)
    - 23004410 (K): 0.0294 (101%) – initial runs showed some contamination/blank. Rerun OK
    - 23004412 (K): 0.0398 (100%)
  - IC reruns
    - 23004406 (Cl): 0.0603 (93%)
    - 23004410 (SO_4): 0.3104 (91%)
    - 23004415 (NO_3-N): 0.0117 (83%)
- PT Samples – WMO
  - pH rerun
    - 23004174: 5.77 (AD=0.06) – carryover from previous sample? Rerun OK
- PT Samples – SRS
  - No data of concern
  - Recoveries typically ~99-102%
  - Min/Max Recoveries
    - 95% for PO4 as P
    - 104% for NO3-
- Occurrences
  - AMoN work performed with no DOC on file
  - NTN samples exceeding hold times for Cl, SO_4, NO_3
  - Freezer outlet faulted affecting 5 year archive study
  - Expired second source standard used
  - Filtered NTN samples left out overnight
    - Will initiate quarterly meetings to facilitate communication among various groups
  - IC calibration standards left out
  - FL criteria exceedances for conductivity
- Five Year Archive Study
  - Started in 2019 (Year 0); 2024 is final year
  - NTN samples kept refrigerated and frozen for each year
  - All samples analyzed annually to compare refrigeration vs freezing for sample preservation
  - Last round of samples run on all NTN platforms during the week of 4/8
  - Data will be compiled and statistics will be run on the data set
  - Plan to work on getting the study published
  - Update at the Fall Meeting

2022 PO Review Findings and Response (Richard Tanabe)

- Background: October 4-6, 2022
  - Purpose: determine how well Program Office functions and processes are serving the NADP stakeholder community and to suggest improvements if warranted
  - Scope: communications, data management, data publishing and display, network support, and financial management
  - Last review that will focus solely on the PO – future reviews will be integrated PO/Lab
  - Review Team: Doug Burns (USGS), Kristi Morris (NPS), Chris Rogers (WSP), Catherine Collins (US FWS)
  - Several recommendations (suggestions for consideration) and findings (request a formal written response)
  - Items below categorized by Findings, followed by PO response
- Findings: Quality Assurance
  - 1. Develop a plan and timeline to evaluate data uncertainty for the NADP networks
    - In recognition of the enormity of the overall DQO task, and very limited resources, the PO prioritized the DQO effort to focus on Assessment of Overall Network Uncertainties (d), and Parsed/Component Network Uncertainties (e) – i.e. NADP data product uncertainties.
    - The PO will draft a more detailed plan for assessment of the uncertainties outlined in work areas (d) and (e). These plans will be presented to the QAAG for review and approval prior to the Fall 2023 meeting.
  - 2. Update the April 2016 Network Quality Assurance Plan
    - The network QAP was reviewed and finalized internally, it was sent to QAAG for review and approval on 4/6/2023. Awaiting final approval from QAAG before posting on the website.
    - The Network QAP was approved by QAAG on 4/18/2023 and posted on the website.
    - Completed
- Findings: Data Management and Presentation
  - 3. Prioritizing transition of front-end LIMS functions to Horizon
    - The WSLH would also like for NADP LIMS to substantially move to Horizon and away from our minimally supported, University of Illinois-developed, LIMS.
    - Due to other major development projects ahead of us, it will be at least next year (2024) before OIS can move us over to the Horizon LIMS.
    - The progress on this move to Horizon is based on OIS' schedule for development and implementation. This will not be completed in 2024.
- Findings: Data Downloading from Website
  - Given the importance of data delivery to users from the web site, the updates to the web site to fix these issues should be the highest priority for the PO/OIS management, including a new agreement with DoIT, if necessary.
  - 4. AMoN data are not downloaded from a final, static database table
    - SQL procedures were created to move lab data into a transfer table for review, then into the web tables for publication.
    - Functionality of scripts reviewed with Mark, and what checks are done before publishing to the web.
    - This will be completed after the 2024 Spring Meeting, it has been identified as a priority.
    - In Progress
  - 5. There are issues with the DoIT widgets developed. Some widgets are using the wrong API calls.

        - The OIS programmer is in the process of documenting all the API calls and creating a list of what needs to be fixed for DoIT
        - OIS programmer to work with DoIT to updates website, dependent on their schedule.
        - The API calls for the existing network data downloads were tested and provided to DoIT, the test website is currently being updated with these changes.
        - In Progress
- Findings: Data Downloading from Website
    - 6. The informal notes on the data logger programming needs to be documented in a formal SOP
        - The SOP was completed and submitted for internal review on 3/15/2023.
        - Completed
- Findings: Precipitation Review
    - 7. PO needs to develop a formal SOP documenting the precipitation review process.
        - Substantial sections of this review process are detailed in the Draft Data Management SOP. The precipitation data review application is currently under development, it will have similar functionality but also improvements. Dana Grabowski will finalize this section when the new system is in place. Completion: Fall Meeting 2023
        - PO is still waiting for precipitation data review application to be completed before SOP can be finalized. A draft version is available.
        - In Progress
    - 8. Precipitation is the most valuable type of climate data provided by the combined networks, and the deployment of nearly 350 electronic rain gauges operated throughout North America with excellent, consistent quality assurance is a valuable (and marketable) asset. Availability of the precipitation data (daily) on the public website should be a focus whenever possible based on staffing resources.
        - We concur with the review team's finding. The NADP PO will explore the development after formally charged to do so by the NADP Executive Committee. If so charged, in Spring 2023, such capacity may be built in about a year's time, dependent on staffing resources and DoIT coordination for front end.
        - In Progress
- Findings: Network Communication
    - 9. Develop a process that effectively gathers network problems from all sources of information and provide data available in a centralized location for all to address the issue.
        - Resolution of this finding was started shortly after the program review, and the solution was implemented on 10/18/2022.
        - "Site Support Hub" is a Google Sheets (Google App Script) based spreadsheet that tracks all of the communications with sites
        - Common equipment issues are identified through precipitation review.
        - It is continually being improved based on needs and requirements.
          - Will automatically identify high priority sites for rapid resolution of issues
        - Completed
- Summary
    - Final Review Team report received 11/22/2022
    - Written response submitted to Review Team on 2/13/2023
    - Review final report and response submitted to QAAG for review/comments on 4/6/2023
    - PO presentation of Findings response 5/4/2023
    - PO presentation of Findings update 5/2/2024
    - In Progress

Spring Meeting 2024 (Winston Luke)
Richard evaluated the calendar with respect to holidays (Easter, Passover), UW Commencement in 2025, and timing of the EPIC conference (ties up a lot of hotel rooms in Madison).

Spring Meeting will be the week of May 12, 2025

Only thing to be determined is the physical location of the meeting – at the Concourse or other hotels? At the Pyle Center? Etc. David Gay will investigate.

2024 Fall Meeting and Scientific Symposium (Melissa Puchalski)

- Fall Meeting and Scientific Symposium, November 4-8, 2024, Duluth, MN
  - https://nadp/slh.wisc.edu/nadp2024/
- Science Symposium: Protecting the Health of Communities and Ecosystems under a Changing Climate
  - Protecting aquatic ecosystems from air pollution impacts
  - Measuring emerging and toxic pollutants
  - Characterizing cultural and environmental impacts of air pollution on tribal lands
  - Linking shifts in air quality, atmospheric deposition, and critical loads to climate-driven events
  - Health and environmental changes driven by shifts to clean energy
  - New tools to communicate air quality and atmospheric deposition results
  - Sustaining long-term monitoring programs
- Inn on Lake Superior
  - Located in the canal district
  - 12 minutes to Duluth International Airport
  - Meeting space in the hotel
  - Free parking
  - Free wifi
  - Free breakfast
  - Nightly s'mores
  - Heated outdoor rooftop pool
- Final Planning Steps
  - Look for announcement on abstracts submissions in late spring/early summer
  - Engagement with Universities and Tribal Agencies to increase participation
  - Engagement with NEPs and Great Lakes associations
  - Work with USFS to develop itinerary for Friday field trip – not finalized yet

Wrap-up (Mike McHale)

Motion to Adjourn – moved by Mike McHale, second by Winston Luke

Motion carries

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