NADP Spring 2024 (NOS Session I.)

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NOS Agenda Tuesday 4/30/2024: 01:30-5:00 CDT

1:30 PM	Welcome, Logistics, Introductions (Mike McHale NOS chair)
1:40 PM	Site Liaison Report (Richard Tanabe)
2:00 PM	EEMS Field Survey Update (Eric Hebert)
2:10 PM	New database demo (Eric Hebert)
2:30 PM	Field Ops and NED Report (Dana Grabowski)
2:45 PM	Discussion on a previous motion (Dana Grabowski)
3:00 PM	Break
3:20 PM	Discussion wrap-up (Dana Grabowski)
3:30 PM	Sample Precipitation Updates (Mark Kuether
3:40 PM	Sample Receiving and Data – (Zac Najacht)
	Network Analytical and QA Reports
4:00 PM	NTN & AMoN (Katie Blaydes)
4:15 PM	MDN & MLN (Christa Dahman)
4:30 PM	AMNet (Vid Grande)

End

1:30 start time by Mike McHale: NOS Chair

-Introductions

Richard Tanabe: Site Liaison Report

- Motion at Spring 2023 to rebrand lab to NAL (NADP Analytical Laboratory)
- Google Scholar alert on 4/20
- Anna McCarty, University of Arkansas-Fayetteville: Undergraduate Honors Thesis cited the NAL
- NADP Benefits and Future Analysis
- “Another benefit of NADP is the quality assurance measures taken by NADP. All samples are collected into bottles that are cleaned at the NADP Analytical Laboratory (NAL) in Wisconsin (NADP, 2024). The samples and results are analyzed at the NAL, then the data are again checked for accuracy and completeness at the NADP Program Office. The National Atmospheric Deposition Program provides the data to the public through the NADP database, allowing anyone to view, use, and/or cite the data.”

Raingage vs Rain gauge

USGS- gage 1892 (still inconsistent on site)

Rain vs precipitation gauge

Proposes a motion to update SOPs, field forms, and website Motion required?

- Motion to change raingage to **Rain gauge**
- Field form reporting times – 1986 daylight savings for standard time removed from field sheets (was on the original 1981 FORF)
- 1999: Declarations of standard or daylight-savings time are not necessary.
  -Unsure if this is due to the address book for DST being located within the database as a checkbox. Field form Reporting Time is inconsistent across networks:

Network	**Format of Field Form**
NADP/NTN	Mix
NADP/MDN	Mix- Tried a DST Checkbox
NADP Precipitation Gauge	Mix- Standard Time
CASTNET	Standard Time
IMPROVE	GMT
CAPMoN	Standard Time

- Should we pursue standardizing the time reported on field forms?
- Should we go back to 1981 field forms? Check boxes (Daylight/ Standard)
- What about the push for permanent Daylight Saving Time?
- It would take some education for operators
- Easier to start January 1st, 202?, most states are already in Standard Time.

- What happened in 2022? (visible gap in the map)
- Focus of 3 sites: MT96, ND00, SD08
- Looking at these 3 sites and Criterion 1,2, and 3
  (Criterion 1. There must be valid samples for at least 75% of the summary period
  Criterion 2. For at least 90% of the summary period there must be precipitation amounts (including zero amounts) either from the rain gauge or from the sample volume.
  Criterion 3. There must be valid samples for at least 75% of the total precipitation amount reported for the summary period.)
- All 3 sites failed for criterion 1 and 3, and ND00 and SD08 passed for Criterion 2.
- ND00 Summary
  - ‘v’ code samples are due to the collector under catching during light winter precipitation events,
  - Mostly all low precipitation samples that the collector didn’t catch,
  - Typical in winter due to blowing snow
  - Issue with the collector exposure, collector was open for well over 6 hours of dry exposure weekly for nearly a two month period,

- Replacement motorbox to the site in Oct. 2022 resolved the issue,
- Samples are coded based on the data and info that we have from the rain gauge, site operator notes and field form,
- During that time the only info we had was the exposure data from the rain gauge which is why all of those samples were coded as invalid due to ‘b’ bulk or ‘u’ undefined.

How do we prevent it?

- Redefine how we utilize the sample lag report (email sent to site after 21 days)
- Monitor the number of samples, billing currently get a query of samples received the previous month
- Expand the communication of sample lag, equipment operations, etc. to funding agency reps sooner
- Tracking of Criterion 1-3 as monthly data review is completed
- Running Criteria Report based on web data using existing aggregation scripts, plan to incorporate lab data as well.
- Envisions using data of sites in the “danger zone” to flag sites that are in trouble.
- Identify the most vulnerable sites
- Voronoi/Thiessen polygons (Thanks to Tim S./Jason L.)
- How much area does a site represent based entirely on their nearest neighbor
- Highlighted the top sites: ID11, NV05, MT00, ND00, ND11, SD99, OK00, TX43, TX16, TX56
- Overlaid map with the 2022 Ca deposition map (can visibly see the highlighted ND00, ND11, SD99 present in the gap for 2022)

Other uses of the polygon maps:

- What if a site closes?
- UT99 was in jeopardy (no longer the case)
- NV05 is a neighbor, also one of the most important sites to the map in that region based on its Voronoi polygon.
- If UT00 closed, it impacts NV05 even more, but also brings AZ03 into the top 10.
- Identify sites by potential impacts to the overall map, a tiered approach (“NADP Prime”)
- If it is an equipment issue, ship to the site 2-day air (if the operator can change prior to the following week) otherwise ship by ground for the following Tuesday
- Limits bulk sample to 1-2 weeks compared to possibly 2-3 weeks
- Only works if we are notified sooner, by 1-800, NOT an email later that week or writing on FORF

What happened in 2023**?**

- As of August 2023, there are still 99 sites not meeting all 3 criterion, including MT96, SD08 and ND00 is on the cusp. Higher than previous years:

Year	Did not meet criteria
2023 (August)	99
2022	87
2021	60
2020	92
2019	70
2018	52

Operator Retirements

Bob Ziegler- PA15 (31 years) had also run PA96 AMoN

Gene Brooks-VA24 (25 years) and CASTNET so 37 years

Vinny Turner- NJ00 (14 years)

Questions

Linda Geiser: Thank you Richard for responding to the questions we've been asking. I like the suggestions on how we can go about solving some of these issues. Can you go back to the table about the danger zones and review how this information would be made available to the operators and the supervisors?

Richard Tanabe: Currently until we refine this, you know this will be an internal report that we'll generate and then we got to once we work out the bugs and we figure out OK this is this is the information we need to get to everybody that would be then we would work on trying to create some report whether we, you know it gets automatically emailed or it gets on the web or something like that. And that could go to funding agencies, supervisors, operators to Jim Renfro's comment as well.

Mike McHale: So yeah, I think you know the operators don't want the site to not make the map. I mean they're doing the work. So, it's I think sometimes it's frustrating for them to think they went out and did all this work and it's not making the map. So, it's not like they don't want it to, you know, But we also don't want it to be, you know, pejorative on them either, you know, because most of the time, you know, they are trying to do the best job they can.

Jim Renfro: So, yeah, that was one of my chat comments was, yeah. Will these reports go to the operators, not just the Rep You think about how you lose 1/4 and how you lose the year and it's more than three. You know I saw a monthly reports to reps. I mean if you if you lose 4 out of your 13 weeks and 1/4 that quarter and you're done, I think you're done. I mean you need to know after two bad weeks and three is max to recover to not lose that quarter. So that's how I've always thought that you just want to correct it after first week, worst case, second week you've got three and a quarter for any reason. So 3's kind of that magic number. That's my danger zone.

RT: And that you know you are you're an operator who has an operator Recognition Award and there's a reason for that. But a lot of times we don't get the information from the sites until, yeah, we're one to two weeks in and then yeah, then we're, you know then we would have to be scrambling to get that prevent that third week. But yes, I totally agree with you.

Aaron Pina: Those slides are also really helpful I think to share if you would be able to make those public or you know share with folks something like data denial studies. I think are good for leadership especially at funding agencies to see what would be missing if we took our spot. I think it's also you know one of one of our spot means one of the sites that you know we support could also help for you know doubt or selecting across the other funding agencies. Could somebody else help pick this up? It's you know this is a vulnerable spot.

The other thing I wanted to ask this is going back to the standard to the times within precipitation. I think I asked this about a year ago and have there been any discussions or references to the World Meteorological Organization for how they standardize their observations and whether these, since they're 24 hours could feed into what's called the Global Telecommunications System (that's the GTS). That Global Telecommunication System is what is used to ingest into models of weather models around the world and they pull from all over remote locations are highly needed island nations and high-altitude sites are highly needed. And so have we thought about connecting with these other systems and so we obviously for these data to be ingested into weather models, global weather models, they would have to meet some requirements. So have there been any designs or looking at some of the standards from WMO?

RT: We haven’t at this point. That is something if it’s raised we could start looking at.

Eric Hebert: EEMS -Field Audit Update

Sites audited during 2023- each year aim for 1/3 of the network

Total of 88 collectors at 72 locations

NTN Collectors 62

ACM Type 34

N-CON 28

MDN Collectors 26

ACM Type 16

N-CON 10

Primary Rain Gauges 88

ETI NOAH IV 56

PLUVIO 2 21

PLUVIO 2-L 8

PLUVIO 2-S 1

PLUVIO 2

- More N-CON collectors are in the field as sites are upgraded
- 88 Rain gauges were visited – database currently says 87 as 1 wasn't entered properly
- Last year we saw a couple of gauges that were outside the 1/10th of an inch criteria- but not this year
- Gauges are working fine for weighing, no downward trend

Temperature checks of the ACM sensors (thermocouple): time consuming and usually involves waiting for the sensors to cool due to radiant heat (shade with an umbrella)

- This year a couple of sites in Alaska were cold enough that the low-level heat was on and we verified they were working right
- 3 sites didn't heat up to 40° in 7 minutes: ID02, MT05 due to thermocouple tip breaking and unable to get a good measurement , RTD not as accurate
  -AK03 was cold upon the site visit
- Technique error can lead to an error if the sensor and ambient temperatures aren't measured at the same time
- About 80% of the temperature checks were above 50°

N-CON collectors

- Lids tend to loosen and are tightened and have Loctite applied during the audits
- 1/3 of these are loose even though Loctite is applied every 3 years
- Better closing mechanism, but their own problems with motor boxes and sensors

Comparison of lid sealing on N-CONs vs ACMs

- In general the ACM collector seals the bucket better when working (no motor box issues and in bulk mode)
- N-CONs have issues with lid arms becoming loose

Sample Prep Procedure

- SOP from the website- highlighted: get the bag in the bucket, seal the bag in the bucket, then go over and weigh the thing with no lid on the bucket and all through the SOP it says be careful not to contaminate this bucket even though it doesn't have a lid on it
- Suggests changing verbiage to say: put the bag in the bucket, seal the bag in the bucket, weight the bucket with the lid on it
    - This keeps the bucket from contamination
    - Negates the need to use the weight written on the lid, which is from 2019 and the weight of the lid isn't necessary if they weigh the complete bucket with the lid and all that's missing is the precipitation
    - Operators will save time weighing the lid
    - It will be necessary to keep the same lid with the bucket every week to eliminate contamination and network bias due to scale differences between the weight of the lid weighed in the lab vs the accuracy of the field scales

<u>Rain Gauge Calibration</u>

- EEMS empties the bucket prior to calibrating a rain gauge
- In the field the gauge starts at a value and adds to it as it rains
- Would like to find out what the average raw bucket weight is and start at that weight or a regional weight that's nominal to what would be seen normally and add the amount of an average rainfall event, as well as the maximum of a rain event
- This would change the procedure for auditing a rain gauge

<u>Updates</u>

- No longer installing GOES at USGS sites – taking them out and installing cellular modems
- Still replacing lithium batteries inside the CR800's when voltage is low
- Updating PDAs for an Android
- Still updating firmware, datalogger programs and firmware in the rain gauges
- Rotating rain gauges knowing now that they need to face a certain direction
- Building sensors that can be added to an ACM collector
  -Improves ACM collector with an open path sensor that mounts to the ACM collector with adapters for the CR1000X- can still connect with a Bluetooth device
  -Can buy from Campbell, but EEMS has started making them
- Would like to be able to edit the logger program used for the OTT Pluvios to get faster data when doing an audit
    - Currently limited to the 15 minutes that it updates the data logger programs- so over 2 hours to do an audit due to waiting 15 minutes between points
    - Audit has a self-test that can be plugged into a laptop
    - Need to get that data stream and put it into the Campbell so that it is known when it is in audit mode and not real data being collected
    - Will work with Richard to come up with a program

- Bob Larson may have started that years ago with AMNet
- Subontracting to Vid as an AMNet expert doing audits at the AMNet sites last year and this year

Questions

Jim Renfro: I was just going to ask what did you mean by the precipitation gauge orientation, how that matters?

Eric Hebert: We learned that the OTT should be oriented with the bubble level and the neural knob that's to the right of that bubble level, pretty much facing South. It's affected be temperature when it's making the weighing measurement, so if it's not facing S, you could be getting some interference from heating if there's not enough room to rotate the OTT. If it's installed incorrectly and it can't be rotated, there's a kind of a fix to put an insulation blanket around it to keep it from heating up. So, one or the other we should be doing when we're in the field and it's not oriented correctly.

JR: I think we're south, so I think we're good.

Mike McHale: Does anybody have any comments about weighing with the lid on any concerns, any thoughts about that motion?

Aleksandra Djurkovic: Duke Forest operator. We should remove that field on the FORF because I don't weigh the lid. I trust the system.

EH: In my opinion the weight of the lid doesn't matter if you're weighing the whole thing.

AD: I operate 3 collectors one site to not get the lid confused which are really on vibrant.

John: For those who have not met Sandra, she is the site operator at Duke Forest NC30, NC96 and NC97.

AD: Hi, this is Aleksandra. What we do at Duke Forest is we do a quarterly check. When you guys send us for the blank and we make sure that we do that we empty out, put a new bucket. So that way, it still gets pretty nasty because, you know, precipitation volumes vary, but that way at least we know at least 4 times a year we're getting that bucket replaced. We're checking on it and making sure that, it's passing and stuff for us. I think wind conditions are the main factor that sometimes it fails just because we usually have a wind breeze around 10:00 every morning at Duke Forest on Tuesdays. In that way we help and we've kind of built that into that quarterly QA check for us.

Richard Tanabe: When we switched from bucket sampling to bag sampling and it became this change of procedures back in 2021- it was how do we make this the least number of changes to the operator and how they were doing things- which was tied to the field form. That's why those SOPs were developed in that manner. But I'm all for changing.

EH: Yeah, you just said you're going to change the FORF. So now you've got two changes.

RT: Again, we need a motion.

MM: Willing to make a motion and then we have a motion and we can make a decision in that way. So, if I'm going to make a motion I want to know if there is anybody else with concerns. I guess my primary concern would be communication to site operators and making sure that half of them are not doing it one way and the other half do it another way. So, I think it would have to go on the field form. Are there any other, I mean we would have to get the word out and make it clear. People get doing the same thing every Tuesday. It's hard to change that.

EH: As a follow-up to that, a lot of them are just taking one lid to the site now. Then they're taking that lid and put in on the other sample and leaving. Two buckets with one lid. So one is always exposed, which is not good either. So it'd be better to have it set with putting the lid on it, keep that lid with the bucket all the time.

Winston Luke: Mike, to your point I think you're right. It's critical that operators are informed and the hard part is that they acknowledge they have receive the message of the change. Sending out an email blast is one thing, but not all operators read them. So that's a bit of a wrinkle there.

JR: I think the key will be you've got two lids in play on a visit. One that's going to stay with the one that's going and one that you've had for the week that's going to go on the one that was sampled. It's 2 in play for the week instead of 1.

Noel Deyette: As someone who's operated a site as well, I can say if we're not paying attention to the weights anymore and they're not noting that the keep lids apart, maybe we need a sticker or a color-coding system. Some way for them to really know week to week. Hey, I used the orange lid this week, let's not get the green one on it. Something like that might be helpful.

EH: On the bag maybe.

Nichole Miller: I don't want to make too much more work for sample receiving and shipping. But if there's some kind of sticker we can put on the bag, just a week identifier so you know what lid goes with a week and it would just be the easiest. They can just write on as they go and they won't get colors confused and things like that too. So that might be the easiest way.

MM: Ok, I'm not making a motion now. Eric and I will work on this over the next day or two and maybe put together a motion and ask some people for input so that if this does move forward, we do it cautiously and do it well. If it needs to be tabled for some time, we can maybe put it out to the group through email or something. I don't want to rush into something and end up six months from now kicking ourselves that we didn't just take a little bit more time.

RT: Only second time this has been brought up: usually need longer for changes.

Eric Hebert: 2024 Site Audit Database Update

- Worked with Tim Sharac and Richard Tanabe to revise all questions
- Greatly expanded the assessment of siting criteria
- Removed many questions that are not applicable to equipment

- Submitted list to QAAG- removed from EEMS scope of work- the siting within 20km of the site- taken care of upon installation
- Switching from Microsoft Access to online data entry
- Planning to ingest PO site contract info data using API
- Realtime QC for duplicated data entry (CA88)
- Brief spot report to focus on site issues only (revisions ongoing) (for site operator and sponsor separate from PO)
- Links to siting criteria and site operator feedback
- Transitioning away from the old Access database that we used to have, and we took the opportunity to revise all the questions that we asked site operators and what we used to assess the equipment with when we're at the site.
- Worked close with Tim Sharac and Richard to revise all those questions and greatly expanded the way we looked at citing criteria cause the old database just said does it meet citing criteria, yes or no, really didn't tell you what didn't meet citing criteria.
    - Broken out into rules and guidelines
    - Removed questions that didn't apply to certain types of equipment
    - Submitted list to QAAG with positive feedback
    - Removed assessing sighting within 20 km from the scope of our work
    - Site operator, sponsor or supervisor will assess this, so no longer a part of the EEMS database
    - Switching from Microsoft Access to an online data base
    - Planning to ingest the site, contact information from Richard directly, on a monthly basis
    - Online data entry will allow real-time QC (will flag info if entered wrong)
    - Brief spot report for site operators and site supervisors (3 pages)
    - Should guidance still be in the reports?
    - More detailed report for users such as Richard and Tim on citing criteria- open to suggestions on what will be included in the more detailed report to the PO and EPA etc. will be available on website
    - Link to a survey for operators, data will be available to the NADP community
    - Any citing criteria deviations will be highlighted as to what needs attention
    - Client access on website will include photos from site audits for cooperators
    - Website will include a map of where the vans are so that cooperators can request a visit to a site having issues if we are nearby

Questions

Richard Tanabe: Just a suggestion for the extra report.
And if you are going to make it available on the website, could you basically kind of make like a

query where, you know, I click, I want the rain gauge information, I want the setting criteria information and I want the operator information.
And then it gives me that report.
Not everything.

Eric Hebert: Yep. Good suggestion.
Much like Kristi's question about sorting.

Tim Sharac: Just a suggestion: guidance is still important.
So I like it to be in the in the report, but I can see maybe where you differentiate between rules and guidance.
With just different color codes.
I like how you highlight it that way.
That's really helpful.
I think this what you showed was very clear and I think that's a big improvement.
Thank you.

EH: So then answer the questions of guidance in a different shade, but both shaded gotcha, Ok.
When they fail, when they fail only failing.

Mike McHale:
I have a few things written down that we can just to capture some of the questions that you asked the World Meteorological Organization comment.
So we've captured that so we can follow up on those.
I know how to write programs to do what you were talking about for the auditing so if you need a little I know you've got great programmers but if you need a little help I've got some examples.

So up next is Dana Grabowski.
So Dana's got a couple things she's going to be talking about.

First is the field ops and Ned reports and then some discussion on a previous motion and this is going to go across the break.

Dana Grabowski- Field Operations/NED Update/ Discussion on a previous motion

- Brief recap since fall
- New employee- Nathaniel Boerner- research support analyst (data review) – brand new a couple of weeks
- ACM inventory update

  -And graph of equipment shipped per year- increase in Aerochem sensors sent out

-ACM motorboxes- clutch issues discovered through precipitation review- switched to a nylon patch set screw in 2023 without Loctite to make for motorbox repairs easier- and change in shipping materials

- How was this resolved?

  -New procedures for final checking the motorboxes- loctite applied

  -Reason and solution for ACM sensor Replacement increases – stainless steel plates and epoxy

  -ACM motobox improvements- haven't seen any issues based on precip data

  -Clutch torque and improved ACM motorbox power supply (both are working out well)

- NCON collector dry exposure and sample validity previous motion- motion presented in 2012 NOS meeting regarding NCON collectors

Motion "Sample validation procedures for N-CON MDN collectors shall be primarily based on whether the collector lost power while open combined with operator assessment of collector's mechanical condition, in order to determine when to invalidate samples due to undefined or bulk mode status. Dry exposures logged by raingage shall only be used as backup and as supplemental information for sample invalidation." (Motion by Karlstrom seconded by Wetherbee)

-Was accepted for NTN and AMoN

-Possible NCON is more accurate

-Often times collector issues are determined through precip review before an operator will notice an issue and comment/ report it

-When Dana started doing precip review in 2019- knows they produce more dry exposure- but has not been making invalidation of data following this motion just based on what the operator writes… discussion?

Questions/Discussion

Greg Wetherbee: Hard to determine whether it is dry exposure and don't want to invalidate samples unnecessarily and treat NCONs differently with sensitive sensor

Dana Grabowski: Agrees- but it is not done based solely on operator reporting currently (since 2019 when Dana came in – this motion was from 2015)

Mike McHale: If you follow that motion, do you feel the data will be in better shape or worse shape?

DG: depends on how you view it but would invalidate less – it's more accurate to go off of precip review and not only rely on operator comments

MM: Combined with- not solely based on

Richard Tanabe: Operators assessment is only once a week for 30 mins

DG:- Primarily based on whether the collector lost power which is sometimes hard to tell with precip review as well

GW: Trying to get away from times when precip was very light or not functioning properly/ lost power but for those kinds of instances its obvious if dead when operator visits, not so much if it was during the week

Looking to get away from blanket 6 hours of data and can't spend this amount of time being a detective- though you do- I would like to err on the side of invalidating fewer samples while realizing a few will slip through the cracks. Cannot rely on the site operator as they are only seeing this for ½ hour per week. I guess if we were to reconstruct this motion- I'd be more in favor of something that didn't make the invalidation automatic (6 hours of dry exposure= sample invalid- say someplace in Washington with light precip/ mist/ thick fog – what does that qualify as? I think there should be some room for interpretation and timely consultation with the site operator if timely and can be woven into this…

Kristi Morris: How well are procedures documented now for invalidating for precip?

DG: No, we don't necessarily reach out to operators- will look at plots, last shipment of motor box, comments, not invalidating based on 1 parameter- I feel we aren't invalidating more than we should be – it would be nice to hear more from operators- we don't have the capacity to reach out and ask every operator how their equipment is working.

GW: Won't always have these comments from operators- sounds like what you're doing now is accurate- but- as Kristi asked about procedure – do need all of this procedurized- we've been putting that on the back burner for some issues and would be great to button up.

MM: great segway into break time and spirit of this motion is being followed and is well documented if someone takes those duties over

Kulbir Banwait (CAPMoN)- Asked what percentage would invalidate data

DG: Bulk- all the time

-6 hours dry exposure for weekly samples

MM: We could discuss this further…

Amy Mager: One thing- we do have the precip review process documented- Bob Larson had this documented and Dana has this documented- not in formal SOP or finalized, but we do have documentation and there are many little details to this process.

MM: Thank you. Changes are documented.

Mark Kuether Sample Precipitation Updates

- What are these “offset” and “shift” notes about?

  -Published change logs for NTN and MDN based on corrections made.

  -Comments are confusing and will describe what they are referencing.

  -Time stamps are not with a time zone- uses a lookup table in the database and applies the database and saves in GMT.

  -Lookup table not updated the same as dataloggers and would be out of sync (last 2 years)

  -Wrong offset value – precipitation, efficiency, classification may be affected

  -Samples may be v code – incorrectly invalidated due to timing differences/ precip.

- Correcting Precip Records-

  -Use a third-party radar source to verify correct precipitation and correct in the database

  -Email Zac and Dana who will reevaluate records and send back to Mark

  -Mark updates the live web data- updates change logs

  -Aggregated concentrations use the precipitation weighted mean (PWM)

  -Changes to precipitation affect the PWM (PWM formula given)

  -Sites affected at this time: CA75, CO96, CO97, OR07 etc.

Questions

Ryan McCammon: It seems that this is updated on an irregular basis- as opposed to a schedule. Have you thought of a schedule?

Mark Kuether: Haven’t yet?

Greg Wetherbee: Thanks for explaining this- so it’s great that this is available- needed to explain complexities and QA to our management. What you described I hope will be in a future procedure- our management – FSP starting to need NADP QA’d data verifiable to USGS standards. Proof of what is done to these data and the quicker this can be in a formal procedure as well as Amy’s WQ stuff- the sooner the better.

MK: Does have a procedure that needs update- what do you need?

GW: How data comes in, evaluated, edited and with a demonstrable USGS compatible FSP. Also helps protect our budget.

MM: This is correcting times, not the QA procedure for precip. Not something done for all sites on a regular basis.

GW: But USGS LDM speak this is part of QA'ing the data and what USGS management means and checking the time format- but both need to be documented.

Zan Najacht- Sample Receiving and Data

- Supplies and samples- received, data entry, across networks, visual observation for NTN contamination
- Sample receiving/Supplies/Data entry and logistics

  -Work closely with Field Operations (NED/ site support)

  -New FedEx federal shipping rates

  -UPS for special situations

  -Moved pH/conductivity/filtering to Ag drive- Katie's group

  -Henry Mall – focus on sample receiving/ supplies/ data review

  -Work together and look for improvements and preliminary data review

  -Monthly Data sets**

  -1075 NTN month

- Active sites per year- similar to past years since 2018

- What impacts our data review and reporting?

  -Site additions/changes

  -Personnel changes

  -Program development (working with Casey Lanhem)

  -Trying to automate where possible

  -Update NTN sample ID number format: T2400001 past TZ99999SW and idea of seasonality – sequential number will restart yearly

- Program based NTN compare report process

  -Consistent with MDN

- Adjust preliminary data review- data streamlining

  -Branched approach – incorporates more staff into the process

  -Refine data set for critical review

  -Final preliminary review and reporting

-Last look before sent along to the PO

- Ongoing:
  - Using strategies to “prescreen” data sets

  -Filtering samples that are definitely A – valid samples

  -Won’t change- e.g., bulk or QR of C

  -Focus review on that middle range

- Data review streamlining

  -Process improvement and help turnaround times

  -Was a very linear process in 2018

  -More branched approach now with multiple people

  -More sample receiving staff chipping in to the process

  -Data streamlining- things to note

  -All data checks/review steps are being maintained

  -All edits are being conducted in the Data Review Program

  -Reorganization and consolidation of the preliminary review steps/checks

  -Team effort

  -Comparison to past years data and methods (early in process and will look at process with DMAG group)

  -QR prelim

    -coding

    -multiple users doing steps for comparison

- Previous

  -Few preliminary steps

  -Mostly dependent on individual sample review/examination

- Goals of new process

  -More focus on preliminary steps- based on categories of review

  -Identify initial steps for preparing data sets.

- Perform new process on monthly datasets.

  -New monthly series of automation streamlining (Casey has this close)

  -Will reduce critical review of individual samples (1/3 of monthly total)

- Not yet an official SOP- will be part of the official NTN data review process SOP to reflect all of these steps.

  -Will take less time overall to complete.

  -Branched

  -Only looking at two months right now- still early

  -Sample validity percentages very comparable

  -Will reduce time (not likely as much as David Gay said- months to weeks, but will save time)

  -Will report more as this moves forward.

Questions

Greg Wetherbee: Thanks for doing such a magnificent job, very important and time consuming.

Winston Luke: Any feel for the cost savings with the new shipping rate structure?

Zac Najacht: No hard numbers yet- Amy and David will know down the road.

Seeing shipping packages that seem incredibly low. Will see big savings coming through. Will look at this in the Fall with more differences.

Mike McHale: Our USGS contract is a fraction of what we pay

Chris Rogers: Timeline to complete the analysis and SOPs?

ZN: Amon through end of 2023- still moving forward with data review and will follow up with SOP updates.

Jim Renfro: For sites with campbell data loggers and good comm it is possible for increasing the posting frequency of the NADP NTN/MLN precip./collector info data page to hourly/ 2 hours from current 4 hours updates?

Richard Tanabe: Yes, we can update this.

Katie Blaydes- NTN and Amon Network Analytical Report

- WSLH Lab Manager
- Overview/ staffing
- Visitors: from UNAM- Amelia Spring 2023, Lourdes Fall 2023

- Staffing- 3 full time chemists and 1 vacancy
- IC challenges – December 4th to January 8th- ICs giving communication errors.

  -Long time to resolve- PC issue

  -200 samples flagged for Cl, NO3 and SO4- A to B not invalid

  -FIA instruments

  -HACH replacement needed from another vendor, keeping in mind TN and TP research

  -Has supplies for now.
- pH/cond./ filtering

  -Moved to Ag drive in June 2023 (samples are still shipped from sites to Henry Mall)

  -Work was absorbed by the analytical team

  -Staff occasionally sent over from Henry Mall to meet this need

  -72-hour hold-time
- TN and TP

  -SNIPIT- acidified secondary sample collected weekly NTN

  -Preservation is causing an over-acidification issue

  -Can correct TN samples <50 mL

  -Continue work over the summer
- Graphs on TN and TP SNIPIT samples- Arboretum and Duke Forest comparisons

  -Very low concentrations that are often below the DL

  -Low volumes

  -Only 3 TP samples above DL and >50 mL samples
- Research- AMoN Alpha samplers

  -Testing ALPHAS in the lab

  -UK made

  -Set up co-located samplers inside the land and in a AMoN shelter outside of the lab

  -Biased low (~25%) results with ALPHAS vs Radiellos- opposite of what the literature says – adjusted extraction solution and now seeing positive bias.
- Looking for direction

-Why? -$ savings

-Prep work costly and supplies for Radiello

-ALPHAS reduce 55-31% for supplies (prep work)

- Disclaimer: Estimated Savings

-~47k in total network cost

-$513 /yr/site

-~20 /site/ 2-week deployment

- Summary:

- ALPHAS are less time consuming to clean and prepare

-ALPHAS are easier to ship due to their durable components

- Staffing:

- APHL funding for a fellow- Walter Ballesteros and Mia Peck- APHL intern

Questions

Kristi Morris- 500 savings from AMoN – current charge or real cost?

David Gay- yes…

Rodolfo Sosa Escheverria- Do you have information about ogawa?

Katie Blaydes- No, not me personally

Analytical Report for Mercury Networks- Christa Dahman

- -Chris Lepley: primary Hg analyst since Nov 21

-Walter Ballesteros: ½ time in Hg lab ½ time in NTN/AMoN

- Rachel Mallum: APHL intern since June 2023- litterfall grinding and compositing

- Kirsten Widmayer: ICPMS chemist- with TECL since 2020 , advisory only

-And other staff as well

- Special efforts- Hg litterfall Network database – LIMS design and testing (thank you Casey)

-Composite framework for composites of composites

-Still using USGS format for review and reports

- MerPAS testing

  -Method est. more in MELD tomorrow

  -Biweekly MDN- no testing performed – still looking for test sites ** cost saving measure

- Major Changes and Nonconformance events

  -No major changes

  -One nonconformance event- April – September 2023 instrument Tekran- resolved

- QC Exceedances – MLN 344 retrievals, 96 total Hg, 24 methylmercury,12 minor issues (storage) 1 QC MeHg

Questions

(None)

Vid Grande- AMNet updates

- Currently 11 active sites
- Most sites now operating better
- OH02 started in January- 60k to prepare the site and specific contractor

Downsides

- Aging equipment – OH02 and NJ30 issues
- OHO2 needed new Tekran
- Hopefully temporary work stoppage at NY98 (Whiteface)
- AK95 and HI00 closing 9./30/24
- MD08 may be closing 6/30/24- retirement of operator and Richard said funds are still there- continuity- who will run it? Poor communications and data gaps

Data access and review

- 2023 data review is mostly complete
- 2024 data for most sites through at least Feb.
- MC03 using DropBox, NY98 using teamviewer (locked up…work stoppage/ power issues and need a frequent reboot), NJ sites weekly submissions, OHO2 using Google Drive
- Working out kinks in the data program- working with Casey- if data misloads etc.
- Moving forward- equipment at HM – audit at OH02, MD08 continues- training of new site operator.

Questions

(None)

Mike McHale: Noted that the meeting is ahead of schedule.

Aleksandra Djurkovic: As an NTN site operator, annual meeting for operators on best practices/ troubleshooting etc.

Mike McHale- Some interested – fall meeting idea?

Noel Deyette- Operator to operator contact and Q&A as well as recording as well

Richard Tanabe- Meeting Attendance QR survey- should we do this instead of your name and email at every meeting? GoogleDrive – only do it once for all sessions- will try tomorrow?

End of session

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NOS Session II. 5/2/2024

NOS Agenda (Session II.)

08:30 AM	Wake-up (Mike McHale)
08:35 AM	Plan for USGS Site Shutdown (Ryan McCammon)
08:50 AM	USGS External Precipitation Chemistry QA Project Update (Noel Deyette)
09:10 AM	USGS Telemetry Upgrades and Integration (Noel Deyette)
09:20 AM	Discussion about the disposition of surplus NOAA Tekrans (Winston Luke)

Plan to save the Network and Preliminary 1 week 2 week Results (Greg Wetherbee)

09:35 AM General Discussion (Mike McHale)

09:50 AM Final Discussion/Questions/Wrap-up (Mike McHale)

10:00 AM End of session

Mike McHale: Introductions

Ryan McCammon: Update on the Plan for USGS Site Shutdowns

- Discussion of emails to the sites that shutdown on 4/30/24. This past Tuesday was the last day for sample collection. From a logistics standpoint- Universities want the equipment removed and how long that will take. Address this in the next several weeks- discussed with EEMS and will be decommissioned in the coming weeks. Most will come to USGS in Cheyenne. Original assumption was to mothball the sites, but some will be done for good.
- Who owns the equipment?
- A site is setup, but then the NED ships a motor box- so becomes hybrid in nature.
- Management wants a clear answer.
- Will work on database collaboration with PO.

Questions

Winston Luke: We've shutdown or moved sites and in order to decommission- we pay Eric. USGS has to pay for it.

Ryan McCammon: Right, but we have a budget shortfall.

-$ lost has already been swept so we are dealing with what is remaining.

Tim Sharac: Tekrans are owned and inventoried by EPA.

RM: Richard said NCON – USGS owned. We do have some time to work on this.

Richard Tanabe: So, Ryan you are lab paid through August- if 8 sites, you will have a credit in the bank and can use some of that.

RM: Thanks for the reminder

Aaron Pina: Nearest neighbor. Richard has that been used?

RM: We did consider this.

TS: 10 mins to make the map.

Mike Bell NPS- We've been working on connecting the sites to Critical Loads to see 0 same kind of 10 minute – CLAD can provide to this conversation.

-Good opportunity for what is missing in our management communication

Process MM

RM: Supervisor is getting a better understanding.

David Gay: going back to Aaron- this has been done in the past but we can redo an analysis like that

Past collaboration

RM: This is unfortunate.

Greg Beachley: CASTNET plots can run this or NTN sites to look at trends in concentration and I don't know with CMAQ- would like to look at sites to be cut and the influence on the plots. Greg is offering to look at this analysis with the sites cut.

Greg Wetherbee: Congress drives site selection and we had a 15% budget cut. VA00 set up 40 years ago. This is sad, but you need to reach out to your congressmen. We tried to let science drive the bus and it didn't pan out. QA sites were also long hanging fruit. Budget drove this- some sites were charging 4X the going rate and made those sites vulnerable. We were hoping to fund NPS sites that NPS was going to operate, and we would fund the analysis. We were trying to implement this, but we are now unable. I agree that network redesign needs to happen. Appreciate idea of working together- but this is difficult to justify to management. We've been fortunate, but those times are over. Mark Nilles study in 1992: this network is 46 years old: many studies have been done. Spatial analysis of the NADP network: 150 sites will cover the nation adequately with a spatial cover- problem is we need to make sure sites are funded by not necessarily whoever owns the back yard- pooling $ would be beneficial to the network and make a spatially optimized network- otherwise we face issues with land and justifying to management running sites outside of our area. See upcoming presentation to save everything.

MM: Need to move on but a further discussion is to come.

RT: Ran the numbers, 340 sampling years, average age was 37 years.

Noel Deyette: USGS Telemetry and 2023 PCQA updates

- USGS updates to Fundamental Science Practices requires removal of GOES telemetry – replacements with cell modems over the coming months where available
- QA process of existing data on NWIS web will involve work with the Program Office
- Currently 13 sites with GOES telemetry will be phased out
- Currently 17 sites with cell modems, 3 sites on WiFi, or FM radio
- Thanks to PO, EEMS, and WSP for helping get cell modems and NL241's installed
- Changes to the USGS project in 2023:
  -WSLH has continued preparing and shipping SB samples to the sites
- -Noel Deyette is preparing and shipping the Interlaboratory-Comparison Program and Field Audit samples from the USGS NY Water Science Center (exception of H1 2023)
  -MDN lost ERTC for the last quarter of 2023
  -MOECC participated through the end of 2023

- Changes to the USGS project in 2024:

  -NTN: MOECC dropped out of the program for the first four months of the program but will be returning

  -MDN: UC Davis and University of Nevada, Reno have been added to the program for a net addition of 1 laboratory to the program

- Qualifying the 2023 Data:
  - All data presented in this presentation is preliminary
  - NTN results for variability and bias in the 2023 samples is higher than past years, which may be attributed to the concentration of the stocks used to prepare blind solutions
  - Some laboratories may have data that was biased due to extended shipping delays and analyzing samples outside of normal holding times.
- MDN Conclusions
- System Blank 3-year Network maximum contamination level is higher (0.161 ng/sample)
- NAL data has improved overall, 2 samples were outside of the 3-fps control limits
- MDN Interlaboratory Comparison:
  - High variability for LEEQ, ERTC
  - Laboratories with the lowest bias include NAL, WML, DASNCU, FRL
  - WMLA has less bias than the WMLM results
  - Glass bottle vs plastic bottle comparison for future UNR shipments and other labs if interested.
- Field Audit Results
- 3-year averages show consistent results for most analytes with the exception of increasing Calcium contamination.
- Loss of Ammonium is increasing slightly.
- A glitch in the Field Audit sample preparation caused a recall of the first batch of samples, which was replaced with diluted USGS SRS samples. The concentrations from some of these samples was too high, and results for these solutions (Specific Conductance > 50 mS/cm) were censored from the Network Max Contamination Level (NMCL) and loss calculations.
- NTN Interlaboratory Comparisons
  - NAL had a positive analytical bias for Specific Conductance, H ion and Calcium.
  - NAL had a negative analytical bias for Sulfate, Chloride and Ammonium
  - Overall bias for the NAL was low compared to other laboratories.
  - Results outside of 3 fps for the NAL included Specific Conductance, H ion, Chloride, Nitrate and Sulfate
  - Laboratories with the least amount of variability include NAL, WSP, ECCC, ACAP and PRI
  - Control charts for the NAL were shown.
- Co-located 2023
  - Sites are still running through early June 2024

    - NY20/20NY: >10% Median Absolute Percent differences for PO4, K, Na, Ca, H ion
    - Note that wildfire smoke did impact sites in the Northeast last summer as seen in the photo from NY20/20NY during the install of the co-located collector.
    - NY99/99NY: All Median Absolute percent differences are <10%
    - Control charts and median percent differences of analytes at both sites were shown.
- Publications Update and Future Considerations
    - 2021-22 USGS SIR Report is still in review.
    - Should be published in the next few months.
    - 2023-24 Report- open to ideas for a different format or no report – updated data release option?
    - Public facing USGS NADP website needs to be updated
    - NWIS data mapper should be publicly available soon
    - USGS site links to NADP social media- AQAW
    - Consider FA/SB report and stopping the program in the future
    - Co-located report- end program after next two years (1 wk 2 wk comparison and wind-rose comparison)

Questions

Christa Dahman: Happy to do some 1-week, 2-week MDN sample comparisons

Noel Deyette: Hoping that we can look at this as well, if not this next year in the future.

Tim Sharac: About the wind-rose- how were you thinking of orienting one vs. the other?

ND: We would keep one collector with the conventional west orientation and then E/SE possibly for the other collector. We will look into this further prior to starting a study. That is at least a year away.

Winston Luke: Just as a point of discussion I'd say these studies are critically important and have to continue. This is an external benchmark on ongoing analytical issues and things can change. Mistakes can be made, problems can creep into the methods or contamination issues and without programs like this, we would be flying blind. So I think this is incredibly important.

ND: Thank you. I am interested in seeing if we want to change the number of samples we're doing or if there's anything else we want to look at instead of the same processes we've been doing for several years now.

Mike McHale: I think that getting away from the reports and making it online. The issue in the USGS is that if it's interpretive it has to go through review. Any plots are interpretive. I think these plots, I don't know that we can, but I think we could argue that they're not interpretive. We'd have to put a data release and then the plots online , no slogging through months of our report review analysis.

ND: I'd really like to get the data to the participating labs sooner. That's kind of the issue with the SIR process right now.

MM: Also it gets a little frustrating. Okay, thank you.

Winston Luke- NOAA- Bulk of Hg is coming to an end

HI AMNet will be ending 9/30/24- looking for other collaborators.

- ARL is not able to continue this. Measurements have been seen for years: there is a lot of Tekran equipment available.
- How to distribute this equipment nationally and internationally moving forward? Remove from federal inventory- might be difficult but not impossible.
- Within the USGS a good use of this would be to run in elemental only as benchmark of different climates and vastly simplify the process
- could be tribes/ colleges/ international/ others
- Possibility of donating to NIMD impoverished nations in both short- and long-term monitoring – ASGM influenced countries by mining operations
- They will be solely responsible for running and maintaining moving forward
- How to get out of inventory? Some are not in the inventory and should be disposed of properly.
    - Donate surplus equipment to the PO.
    - Don't want to burden anyone with these instruments- many of which are in working order-some will be held onto for Beltsville- at least 7-8 available some for parts to the NED
    - Open to discussion- don't let this equipment go to waste

Questions

Mike McHale: Anyone want a Tekran?

Linda Geiser: Are there any full sets of eqp- state dept has staff at 80 US embassy's- might be interested in monitoring and wouldn't leave the federal government- convince them why that they need it and for embassy staff and levels of pollution- would make for a nice map.

Winston Luke: Good idea- can determine a plan and suggestions offline as well.

Emmi Felker-Quinn: EPA folks have been state dept fellows- they might be good contacts for this – Jeff Herrick/ John O. – Linda G is an air quality fellow right now- when state dept put up monitors- they mine other federal agencies and universities- mine experts- MOU at the agencies and assign staff- Linda has been working with Madagascar- van of data and can follow up with state dept air quality embassy leads.

Tim Sharac: Would it make sense to move them from NOAA to NADP until more decisions can be made in the future? Space?

Rodolfo Sosa Echeverria: Why are we closing HI site? Receptive to work with passive samples?

WL: This loss hurts- one of the premiere studies – unfortunately loss of support- possible mothballing – passive samplers would most likely be possible- but done at NOAA baselines – monitoring lab needs to be paid for due to budget constraints and analytical requirements- HI would like to see these measurements continue.

MM: One more topic to cover this morning – Greg Wetherbee plan to save the network

Greg Wetherbee: Preliminary Results- Independent Analysis of the NTN- 1 wk 2 wk Composite Sampling Study

- 1993-1995 Mark Nilles study- unpublished – mentioned in CAL QA reports

AZ06- GA41, ID11, KS31, PA42, TN00, WI36

Not as much data in the winter

Slight positive bias for all analytes-likely due to minor evaluation

NEON- refrigerated- 2 weeks

Thanks to Mark Kuether for the data

Results: relative differences- positive means that the two week samples were positive bias

- Of 325 samples total- all less than 5% Variability for NH4, NO3 and SO4,

  pH had GA41 with the most variability

  NH4 variable

  NO3 looks good

  SO4 decent

  Cl, Ca Mg, Na hard to show without a log scale

  K variable mostly GA41

- Will do NTN comparison at NY20
- Need to consider this by 2025 for NTN and MDN- suggestion as these compare very well to deal with budget constraints and keep the networks.
- Suggest 2025 redesign – important for CLAD and TDEP as well.
- Keep the networks together and avoid failure.
  - Move sites by 2025 to good spatially distributed locations or kick the can and avoid this

Discussion

Mike McHale: Start the discussion.

Mike Bell: Have you done the cost analysis for savings per site and the entire network?

MM: Talked to David and what I would suggest is talk before the next budget meeting

Needs to be done over a period time to maintain the PO.

Greg Wetherbee: We just saw presentations about 20k to the black- chemist vacancy is keeping us in the black- walking a thin line- when lead agency kills sites due to the budget- stuff just got real- commend David and PO on ways to cut costs- but if we ship half the # of samples etc. this will be a big savings but need to consider time for the labor.

We need to reduce the sample load by half for the flagship network- even 30% savings on 3 mill program is huge.

The day of reckoning is here- we need to consider this to save and support interagency collaboration.

You will get the same number without the resolution and cutting costs.

Said in 2017- need to go to bag sampling.

Kristi Morris: Consider 1- site operator perspective- there can be some lax 2- a missing sample increases the time that you are missing samples for- there are a host of considerations.

GW: still need to visit weekly: possible composite sampling.

MM: No questions online.

Tim Sharac: I don't do budgets but we reduce temporal over spatial resolution. I know cuts come quickly- appetite for a rainy day fund? USGS/EPA… for when these budget cuts happen.

MM: Unofficial- not really possible for us- how to carry over and can get scraped at a higher level to other cuts.

Very difficult to convince higher ups that we don't need all the money this year- great idea but difficult to happen.

GW: USGS has been a rainy-day fund for NADP but now we are in a bit of a drought

MM: Personal opinion- major changes would require a 12-point plan or something along those lines and other points people are thinking

Understand the impetus to move forward- but needs to be considered

RT: Mike could make a point in ad hoc committee

MB: will add this to executive agenda tomorrow

MM- EOS next- ready to go to break Thanks Greg for this presentation

Martin Shafer: Noted a budget analysis will be needed prior to any changes

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