

## MELD Meeting Minutes

2021 NADP Fall Meeting

Virtual

October 25, 2021

Co-chair: Richard Haeuber

Co-chair: Colleen Flanagan Pritz

Secretary (unofficial): Katherine Ko/Colleen Flanagan Pritz

### Objectives

1. NADP Hg updates, including MDN in west, MeHg in Rain, Dry Dep Model
2. Litterfall Hg 12-Point Plan and updates to sampling protocols
3. Discuss a new initiative: A Passive Hg Network
4. Minamata Convention updates, including monitoring guidance
5. Share recent related work

### Key Takeaways

1. **MDN in the West:** Decline in MDN and AMNet sites has slowed down. Ongoing efforts to work between agencies and with Tribes to fill gaps.
2. **Dry Dep Model:** Weekly modeled dry dep estimates for 4 sites, provided by Muge's dissertation; next step for all sites, followed by expert working group and NADP review.
3. **Methyl Hg:** Should we continue measuring MeHg in precipitation and litterfall? This is not a question about whether MeHg in precipitation and litterfall are scientifically important; rather, the question is driven by potential problems with the MeHg measurement method. Lab looking into absorption of MeHg to walls of plastic bottle. Follow-up calls with sites will occur. Other groups have been measuring and publishing methylmercury in precipitation, notably in South Korea (e.g., GIST, Seoul National University). Discussions with these groups about their methods, findings, and experiences may be worthwhile.
4. **Litterfall:** The Mercury Litterfall Network (MLN) is a permanent NADP network. Updates to 12 Point Plan to be archived by PO, proposed analytical changes to SOP for improved efficiency, ad hoc group to address addition of a western site.
5. **Passive Hg Initiative:** MELD endorsed the implementation plan proposed by the PO. Next steps include lab verification study with Tekran and intercomparison of various methods at Henry Mall.

### Meeting Agenda (October 25, 11am-2:30pm EST)

**11am:** Welcome and Introductions

**11:15am:** Hg Updates: NADP Program Office

**11:45am:** Litterfall Hg 12-Point Plan: Network Implementation

**12pm:** Litterfall Hg SOP: Updates

**12:15pm:** New Initiative: A Passive Hg Network

**1pm:** BREAK

**1:15pm:** Minamata Convention on Mercury: Updates and Discussion

**1:45pm:** Round Robin

**2:25pm:** Next Steps

## 2:30pm: ADJOURN

- Meeting commenced at 11am EST
- Rick presented updates since Spring 2021 Meeting, an overview of the agenda, and meeting objectives

### Mercury Updates from NADP Program Office

*David Gay and Mark Olson, WSLH*

- The decline in MDN and AMNet sites has slowed down in 2021.
- MDN sites planning to open:
  1. AK02 (Juneau, NPS)
  2. WY06 (WY26 now in Pinedale)
  3. MN97 (Grand Portage)
  4. NE25 (Winnebago)
  5. SC03 (Savannah River)
  6. WI93 (Eagle Heights)
  7. MNxx (Fond du lac)
- AMNet new sites opened:
  1. AK95 (Utqiaqvik, old MS12 site)
  2. IL68 (East St. Louis)
- Litterfall is going well, up to 23 ongoing sites now.
- Ongoing work with:
  1. Fish & Wildlife Service
    - Working with Catherine Collins to add MDN to NTN sites, and add new MDN measurements to refuges
    - Funding and support are there; now it is down to individual refuges having time and resources
    - Aiming for sites in MT, AK, ID, and NM, with backups in OR, AZ, NV, TX, and NE. Add to current NADP sites in NJ, CO.
  2. EPA and Tribes
    - Focused on Tribes in western US, with general interest but nothing of substance yet
    - Have put together budgets, explored possible internal funding, and made a few presentations to Tribal Air Coordinators monthly conference call, Tribal Air Monitoring Support Center (TAMS) Steering Committee, and Western Regional Air Partnership Board
    - Confederated Tribes of the Umatilla Tribe have equipment up and ready but having funding difficulties.
    - Yurok Tribe and Winnebago Tribe have equipment, were up and running, but need funds
    - Juneau, AK site restarting under NPS
    - Passive Hg network would be great opportunity to engage Tribes and fill data gaps in the West
  3. BLM and USDA-FS
    - Handoff: State of Wyoming funded on FS property at WY26, became WY06 in Pinedale operating under BLM
- Dry Deposition Model Development (Muge Kafadar Yasar)

- Model is together, results next, also planning a model sensitivity analysis
- Dry dep box model was developed based on Bash's model (EPA) and Zhang and He's model (Environment Canada)
- Input meteorological data, land use, canopy height, and ambient Hg concentrations. Ran calculations with sites NY06, NY43, OH02, MD08. Dealt with missing data by mean imputation (monthly mean). Preliminary data show that GEM is dominant.
- Next steps: statistical analysis (compare with previous studies, dry dep flux) and model sensitivity analysis.
- Suggestions: consider accounting for GOM and PBM (multiplication factor and sensitivity analysis). Perhaps working group for this model will form.
- Muge's work will provide weekly modeled dry dep estimates for 4 sites; next step for all sites, followed by NADP review and expert working group.
- Methyl Hg in Rain (Mark Olson)
  - Currently 7 MDN sites (in MN, TN, and NJ) request MeHg in precipitation
  - Sampling has changed from monthly composite to weekly since June 2021. Aliquot taken for sampled of at least 200mL.
  - About 30% of sample aliquots have been analyzed:
    - Primary contaminants are pollen/plant and animal/insect.
    - MeHg accounted for >2% of THg in all samples.
    - 75% of samples analyzed measured at or below MDL (0.1 ng/L)
  - Next steps: if we continue, should we go back to monthly composite?
  - New issue identified: MeHg is adsorbing onto the surface of the plastic bottles
  - Discussions to continue with ad hoc group.

#### Litterfall Hg 12-Point Plan: Network Implementation

*Doug Burns, USGS*

- Past motion to make Hg Litterfall network a permanent NADP network was approved, now Mercury Litterfall Network (MLN)
- Drafted 12-pt plan based on M. Risch's earlier version. Reviewed by C. Eagles-Smith and E. Felker-Quinn, now have a version 2.0
- Includes background, data products and management, protocols, QA/QC, costs, and more.
- Next steps: QA information and experiments, data quality codes, data roll out/communication, committees' involvement
- Ad hoc group to form on establishment of western litterfall sites.

#### Litterfall Hg SOP: Updates

*Mark Olson, WSLH*

1. Can we subsample 10% of mass to improve efficiency?
  - 4 sites, 4 collectors per sites, triplicate analysis
  - Strong agreement with 2019 reported values, BUT high variability between subsamples
  - Conclusion: No, whole sampling and processing is required for accurate deposition measurements
2. Oven drying?
  - Strong agreement with 2019 reported values

- Conclusion: Yes, oven drying at 50°C has little to no effect on results. NADP will edit Litterfall SOP to include oven drying instead of freeze drying. Will improve efficiency.
- 3. Should we continue measuring MeHg in litterfall?
  - MeHg is reliably 1% or less of THg in litterfall. Is anyone using the data?
  - Suggestion: could ask site operators if anyone is using the data. Ad hoc group to address

### New Initiative: A Passive Hg Network

*Mark Olson, WSLH and Kristi Morris, NPS*

- July 2021 motion passed: “The NADP Program Office will develop an implementation plan for a passive Mercury monitoring Network for review and consideration by the Executive Committee to enhance the economic sustainability of the NADP Mercury enterprise.”
  - PO proposed a supplemental passive GM network (monthly sampling) and an intercomparison study of approaches for expanded Hg measurements
  - Passive technology can provide long term trends, spatial patterns, and Hg hotspots. Cannot address data needs like Hg speciation, dry dep, source attribution, or modeling inputs. Other approaches could be applied on smaller basis to address.
  - Advocates will be invited to participate in Intercomparison Study at WSLH, under NADP. NOAA and Environment Canada are interested.
- DRAFT 12-pt plan is available and has been condensed to 8 points:
 

1. Background	5. Budget and Staff Support
2. Operating Protocols	6. Funding
3. Products	7. Operation within NADP
4. QA/QC	8. Transitional Period
- Timeline
  - Early 2022: Phase I – lab verification with Tekran (deployment at UW and Toronto and analyses); The mercury labs at Environment and Climate Change Canada (Steffen/Stupple) and National Central University, Taiwan (Sheu) are interested in participating.
  - Spring 2022: Phase II – intercomparison study (note: currently delayed to summer after announcement of Mark Olson resignation)
- Motion introduced in chat by D Schmeltz: “I would like to introduce a motion for MELD to endorse the PO continuing to move forward to develop this initiative, as Mark presented, including the more inclusive lab verification (e.g., ECCC, and NCU).”
  - Zoom poll: 30 yes; 1 no

### Minamata Monitoring Update

*Terry Keating, EPA*

- Visit [mercuryconvention.org](http://mercuryconvention.org) to stream COP4 live.
- COP 4.1 – November 1-5, 2021, virtual meeting, limited agenda
  1. Presentation on monitoring guidance
  2. Final decisions on COP 4.2
- COP 4.2 – March 2-22, Bali, Indonesia, limited attendance?
- COP 5 – November 2023?
- Preparing for COP4 (2021)

- Discussion of effectiveness indicators
- Drafting monitoring guidance
- Canada/Norway facilitated consultations
- Main Monitoring Guidance Document
  1. Introduction and Objectives
  2. Comparable Monitoring Data and Effectiveness Evaluation
  3. Atmospheric Hg Monitoring
  4. Biota Hg Monitoring
  5. Human Biomonitoring
  6. Cross-Media Data Management and Analysis
  7. Annex – Summary of Tiered Recommendations
- Supplemental Material
  - Review of existing monitoring programs
  - Catalog of relevant SOPs
  - QA/QC in lab analysis
  - Template for data sharing/reporting
- Tiers
  1. Tier I – entry-level, resource constrained
  2. Tier II – monitoring for trend attribution
  3. Tier III – research for process understanding
- Atmospheric Monitoring: emphasizes adoption of SOPs from existing works. Tiers differ primarily by method and locations.
- Biota Monitoring: consistent, repeated measurements by species and location. Tiers differ primarily in number of sites and metadata/ancillary data collected.
- Human Biomonitoring: emphasizes guidance provided by WHO. Tiers differ primarily in selection of target population.
- Next steps: complete supplemental material for monitoring guidance, reach consensus on revised list of effectiveness indicators, discuss overall EE framework (Canada/Norway proposal)

### Round Robin

- *Peter Weiss, UC Santa Cruz*: Study on lichens as bioindicator of atmospheric deposition of mercury in New Almaden Mining District, California. No systematic difference between rinsed vs unrinsed lichens. Speciated Hg in lichens show 87% Hg<sup>II</sup> (GOM), 13% Hg<sup>0</sup> (GEM), and insignificant MeHg.
  - Connection established off-line with Linda Geiser, who has data on Hg in lichens from the Pacific Northwest
- *Winston Luke, NOAA*: Hg measurements at Carlsbad Caverns, and moving speciation system from Grand Bay, Mississippi to Utqiaqvik, Alaska (near Barrow)
- *Doug Burns, USGS*: working on new software called WRTPS (Weighted-Regression on Time, Precipitation, and Season). Play on existing WRTDS for streams and rivers. Programmed in R and will be publicly available.
- *Emmi Felker-Quinn, NPS*: interested in a litterfall pilot study western park dominated in conifer forest. Considering Rocky Mountain or Glacier national parks.

- *M. Olson* – a park in California expressed interest, but they had lots of snowpack. Would be happy to continue conversation.
- *K. Morris* – there would probably be year-round sampling, so the cost might go up compared to seasonal sampling. See what we can do to get a trial site up and running.
- *D. Burns* – could actively sample needles as an alternative
- *S. Nelson* (in chat) – yes, there is seasonality. [Sheehan et al. 2006](#) did this in Acadia looking at conifer and hardwood litterfall and Hg.
- *C. Dahman* (in chat) – we should get some forestry experts involved in the discussion
- *R. Brantlinger* (in chat) – CO 96 USFS (Molas Pass) is interested
- *C. Eagles-Smith, USGS* – Dragonfly Mercury Project is going on its 12<sup>th</sup> year, with increased participation in 2021 and growing partnerships with Fish & Wildlife Service, Appalachian Mountain Club, and Dartmouth College. Also received seed funding for national-scale model to look at watershed and biogeochemical drivers. 2020 data were released, 2021 data will start releases in next few months. Interactive data dashboard coming within a month.
- *S. Steffen, Environment Canada* – global Hg passive sampler preliminary results: global average is 1.41 ng m<sup>-3</sup> and North American average is 1.42 ng m<sup>-3</sup>. There is some seasonal variability.
- *C. Flanagan Pritz, NPS* – collecting fish and dragonfly Hg data in Rocky Mountain National Park to assess post-fire effects. Feel free to reach out to collaborate.
- *D. Schmeltz* – Hg brochure is coming along. Should be near final in a few weeks.

[Wrap Up and Next Steps](#) – hopefully we see everyone in person in Madison in April 2022!